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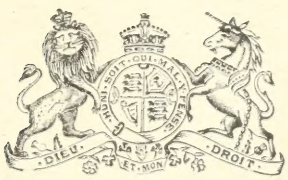

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LIST OF SESSIONAL PAPERS

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CONTENTS OF VOLUME E.

Fifth Census of Canada, 1911—Volume V—Forest, Fishery, Fur and Mineral Production.
Fifth Census of Canada, 1911—Volume VI—Occupations of the people.

CONTENTS OF VOLUME 1.

(This volume is bound in three parts.)

1. Report of the Auditor General for the year ended 31st March, 1915, Volume 1, Parts a b and A to L; Volume III, Parts V to Z. Presented by Sir Thomas White, February 7 1916.
Printed for distribution and sessional papers.

1a. Report of the Auditor General for the year ended 31st March, 1915, Volume II, Parts M to U. Presented by Sir Thomas White, February 10, 1916.
Printed for distribution and sessional papers.

1. Report of the Auditor General for the year ended 31st March, 1915, Volume IV, part ZZ. Presented by Sir Thomas White, February 14, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 2.

2. The Public Accounts of Canada for the fiscal year ending March 31, 1915. Presented by Sir Thomas White, February 1, 1916.. ..*Printed for distribution and sessional papers.*

3. Estimates of sums required for the service of the Dominion for the year ending March 31, 1917. Presented by Sir Thomas White, 1916.
Printed for distribution and sessional papers.

4. Supplementary Estimates of sums required for the service of the Dominion for the year ending March 31, 1916. Presented by Sir Thomas White, 1916.
Printed for distribution and sessional papers.

5. Supplementary Estimates of sums required for the service of the Dominion for the year ending March 31, 1917. Presented by Sir Thomas White, 1916.
Printed for distribution and sessional papers.

5*a*. Further Supplementary Estimates for the service of the Dominion for the year ending March 31, 1917. Presented by Sir Thomas White, 1916.
Printed for distribution and sessional papers.

5*b*. Further Supplementary Estimates for the fiscal year ending March 31, 1917. Presented by Sir Thomas White, May 1916.. .. .. ..*Printed for distribution and sessional papers.*

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6. List of Shareholders in the Chartered Banks of the Dominion of Canada as on December 31, 1915. Presented by Sir Thomas White, February 1, 1916.
Printed for distribution and sessional papers.

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7. Report on certified cheques, drafts or bills of exchange, dividends, remaining unpaid and unclaimed balances in Chartered Banks of the Dominion of Canada, for five years and upwards prior to December 31, 1915. Presented by Sir Thomas White, February 1, 1916.
Printed for distribution and sessional papers.

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(This volume is bound in two parts.)

8. Report of the Superintendent of Insurance for the year 1915. Presented by Sir Thomas White, 1916.. .. ..*Printed for distribution and sessional papers.*

9. Abstract of Statements of Insurance Companies in Canada for the year ended December 31 1915. Presented by Sir Thomas White, April 10, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 6.

10. Report of the Department of Trade and Commerce for the fiscal year ended March 31, 1915: Part I.—Canadian Trade (Imports in and Exports from Canada). Presented by Sir George Foster, January 13, 1916.. ..*Printed for distribution and sessional papers.*

CONTENTS OF VOLUME 7.

10*a*. Report of the Department of Trade and Commerce for the fiscal year ended March 31, 1915: Part II.—Canadian Trade with (1) France, (2) Germany, (3) United Kingdom, (4) United States. Presented by Sir George Foster, 1916.
Printed for distribution and sessional papers.

10*b*. Report of the Department of Trade and Commerce for the fiscal year ended March 31, 1915: Part III.—Canadian Trade with foreign countries (except France, Germany, the United Kingdom and United States). Presented by Sir George Foster, 1916.
Printed for distribution and sessional papers.

10*c*. Report of the Department of Trade and Commerce for the fiscal year ended March 31, 1916; (Part IV.—Miscellaneous Information.) Presented by Sir George Foster, 1916.
Printed for distribution and sessional papers.

10*d*. Report of the Grain Commissioners for Canada. (Part V.) Presented by Sir George Foster, 1916.. .. ..*Printed for distribution and sessional papers.*

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10*e*. Report of the Department of Trade and Commerce for the fiscal year ended March 31, 1915: Part VI.—Subsidized Steamship Services, with statistics showing steamship traffic to December 31, 1915, and Estimates for the fiscal year 1916-17. Presented by Sir George Foster, 1916.. .. ..*Printed for distribution and sessional papers.*

10*f*. Report of Trade and Commerce for the fiscal year ended March 31, 1915: Part VII.—Trade of Foreign Countries, Treaties and Conventions. Presented by Sir George Foster, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 9.

11. Report of the Department of Customs for the year ended March 31, 1915. Presented by Hon. Mr. Reid, January 18, 1916.. .. ..*Printed for distribution and sessional papers.*

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12, 13, 14. Reports, Returns and Statistics of the Inland Revenue of the Dominion of Canada, for the year ended March 31, 1915. Part I.—Excise. Part II.—Inspection of Weights and Measures, Gas and Electricity. Part III.—Adulteration of Food. Presented by Hon. Mr. Patenaude, February 18, 1916..*Printed for distribution and sessional papers.*

CONTENTS OF VOLUME 11.

15. Report of the Minister of Agriculture for the Dominion of Canada, for the year ended March 31, 1915. Presented by Hon. Mr. Burrell, January 20, 1916.
Printed for distribution and sessional papers.

15*a*. Report of the Dairy and Cold Storage Commissioner for the fiscal year ending March 31, 1915. (Dairying, Fruit, Extension of Markets and Cold Storage.) Presented by Hon. Mr. Burrell, February 1, 1916.. .. .. ..*Printed for distribution and sessional papers.*

15*b*. Report of the Veterinary Director General for the year ending March 31, 1915. Presented by Hon. Mr. Burrell, 1916.. .. ..*Printed for distribution and sessional papers.*

15*c*. Report on "The Agricultural Instruction Act," 1914-15, pursuant to Section 8, Chapter 5 of 3-4 George V. Presented by Hon. Mr. Burrell January 24, 1916.
Printed for distribution and sessional papers.

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16. Report of the Director and Officers of the Experimental Farms for the year ending March 31, 1915. Presented by Hon. Mr. Burrell, January 31, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 13.

17. Criminal Statistics for the year ended September 30, 1914. (Appendix to the Report of the Minister of Trade and Commerce for the year 1914.) Presented by Sir George Foster, 1916.. .. ..*Printed for distribution and sessional papers.*

18. Return of By-elections for the House of Commons of Canada held during the year 1915. Presented by Hon. Mr. Speaker, 1916.. ..*Printed for distribution and sessional papers.*

CONTENTS OF VOLUME 14.

(This volume is bound in two parts.)

19. Report of the Minister of Public Works on the works under his control for the fiscal year ended March 31, 1915. Presented by Hon. Mr. Rogers, January 13, 1916.
Printed for distribution and sessional papers.

19*a*. Ottawa River Storage for year 1915.. .. ..*Printed for distribution and sessional papers.*

19*b*. Interim Report of the Commission appointed to examine into certain general conditions of Transportation bearing on the economic problem of the proposed Georgian Bay Canal. Presented by Hon. Mr. Rogers, April 14, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 15.

20. Annual Report of the Department of Railways and Canals, for the fiscal year from April 1, 1914, to March 31, 1915. Presented by Hon. Mr. Cochrane, February 2, 1916.
Printed for disfribution and sessional papers.

20*a*. Canal Statistics for the season of navigation, 1915. Presented by Hon. Mr. Reid, May 17, 1916.. .. ..*Printed for distribution and sessional papers.*

20*b*. Railway Statistics of the Dominion of Canada, for the year ended June 30, 1915. Presented by Hon. Mr. Cochrane, April 4, 1916.. ..*Printed for distribution and sessional papers.*

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20*c*. Tenth Report of the Board of Railway Commissioners for Canada, for the year ending March 31, 1915. Presented by Hon. Mr. Cochrane, February 2, 1916.
Printed for distribution and sessional papers.

20*d*. Telephone Statistics of the Dominion of Canada, for the year ended June 30, 1915. Presented by Hon. Mr. Cochrane, April 13, 1915.
Printed for distribution and sessional papers.

20*e*. Express Statistics of the Dominion of Canada, for the year ended June 30, 1915. Presented by Hon. Mr. Cochrane, April 13, 1916.. ..*Printed for distribution and sessional papers.*

20*f*. Telegraph Statistics of the Dominion of Canada, for the year ended June 30, 1915. Presented by Hon. Mr. Cochrane, May 16, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 17.

21. Forty-eighth Annual Report of the Department of Marine and Fisheries, for the year 1914-1915.—Marine. Presented by Hon. Mr. Hazen, January 13, 1916.
Printed for distribution and sessional papers.

22. List of Shipping issued by the Department of Marine and Fisheries, being a list of vessels on the registry books of the Dominion of Canada on December 31, 1915. Presented by Hon. Mr. Hazen, 1916.. .. ..*Printed for distribution and sessional papers.*

23. Supplement to the Forty-eighth Annual Report of the Department of Marine and Fisheries for the fiscal year 1914-15. Marine.—Steamboat Inspection Report.
Printed for distribution and sessional papers.

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24. Report of the Postmaster General for the year ended March 31, 1915. Presented by Hon. Mr. Casgrain, January 13, 1916.. .. .. ..*Printed for distribution and sessional papers.*

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25. Annual Report of the Department of the Interior for the fiscal year ending March 31, 1915. Presented by Hon. Mr. Roche, January 13, 1916.
Printed for distribution and sessional papers.

25*b*. Annual Report of the Topographical Surveys Branch of the Department of the Interior, 1914-15. Presented by Hon. Mr. Roche, May 1, 1916.
Printed for distribution and sessional papers.

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25*c*. Report of progress of stream measurements for the calendar year 1915. Presented by Hon. Mr. Roche, 1916.. .. ..*Printed for distribution and sessional papers.*

25*d*. Fourteenth Report of the Geographic Board of Canada for year ended March 31, 1915.
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25*e*. British Columbia Hydrographic Surveys .. ..*Printed for distribution and sessional papers.*

25*f*. Manitoba Hydrographic Surveys, 1912-14.. ..*Printed for distribution and sessional papers.*

25*g* Report of the Chief Medical Officer Department of the Interior, for 1915.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 22.

26. Summary Report of the Geological Survey Department of Mines, for the calendar year 1914. Presented by Hon. Mr. Roche, 1916.
Printed for distribution and sessional papers.

26*a*. Summary Report of the Mines Branch for the calendar year 1914. Presented by Hon. Mr. Roche, 1916.. .. ..*Printed for distribution and sessional papers.*

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27. Report of the Department of Indian Affairs for the year ended March 31, 1915. Presented by Hon. Mr. Roche, January 19, 1916..*Printed for distribution and sessional papers.*

28. Report of the Royal Northwest Mounted Police, 1915. Presented by Sir Robert Borden, January 19, 1916.. .. ..*Printed for distribution and sessional papers.*

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29. Report of the Secretary of State of Canada for the year ended March 31, 1915. Presented by Hon. Mr. Blondin, February 28, 1916.
Printed for distribution and sessional papers.

29*a*. Report of the work of the Public Archives for the year 1914. Presented, 1916.
Printed for distribution and sessional papers.

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30. The Civil Service List of Canada for 1915. Presented by Hon. Mr. Patenaude 1916.
Printed for distribution and sessional papers.

31. Annual Report of the Civil Service Commission of Canada for the year ended August 31, 1915. Presented by Hon. Mr. Patenaude, 1916.
Printed for distribution and sessional papers.

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32. Annual Report of the Department of Public Printing and Stationery for the fiscal year ended March 31, 1915. Presented by Hon. Mr. Blondin, March 20, 1916.
Printed for distribution and sessional papers.

33. Report of the Secretary of State for External Affairs for the year ended March 31, 1915. Presented by Sir Robert Borden, February 23, 1916.
Printed for distribution and sessional papers.

34. Report of the Minister of Justice as to Penitentiaries of Canada for the fiscal year ending March 31, 1915.. .. ..*Printed for distribution and sessional papers.*

35. Report of the Militia Council for the Dominion of Canada, for the fiscal year ending March 31, 1915. Presented by Sir Sam Hughes, February 21, 1916.
Printed for distribution and sessional papers.

35*a*. Employment for the Expeditionary Forces after the war. Presented, 1916.
Printed for distribution and sessional papers.

36. Report of the Department of Labour for the fiscal year ending March 31, 1915. Presented by Hon. Mr. Crothers, January 25, 1916.
Printed for distribution and sessional papers.

36*a*. Eighth Report of the Registrar of Boards of Conciliation and Investigations of the proceedings under "The Industrial Disputes Investigation Act, 1907," for the fiscal year ending March 31, 1915. Presented by Hon. Mr. Crothers, January 25, 1916.
Printed for distribution and sessional papers.

CONTENTS OF VOLUME 27.

37. Eleventh Annual Report of the Commissioners of the Transcontinental Railway, for the year ended March 31, 1914. Presented by Hon. Mr. Cochrane, February 2, 1916.
Printed for distribution and sessional papers.

38. Report of the Department of the Naval Service, for the fiscal year ending March 31, 1915. Presented by Hon. Mr. Hazen, January 13, 1916.
Printed for distribution and sessional papers.

38*a*. Supplement to the Report of the Naval Service—Contributions to Canadian Biology, 1914-15. Presented by Hon. Mr. Hazen, 1916.
Printed for distribution and sessional papers.

38*b*. Natural History of the Herring. Presented, 1916.
Printed for distribution and sessional papers.

39. Forty-eighth Annual Report of the Fisheries Branch of the Department of the Naval Service, 1914-1915. Presented by Hon. Mr. Hazen, January 13, 1916.
Printed for distribution and sessional papers.

40. The Report of the Joint Librarians of Parliament. Presented by Hon. Mr. Speaker, January 13, 1916.. .. ..*Not printed.*

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41. Copies of Orders in Council authorizing Regulations for the Department of Naval Service in accordance with Section 47, Chapter 43, 9-10 Edward VII, as follows:—

P.C. 2864, dated the 4th December, 1915, Payment of Separation Allowance in the case of Warrant Officers.

P.C. 3009, dated 21st December, 1915, with reference to application of the Naval Discipline Act, etc., for the Government of the Naval Volunteer Force.

P.C. 63/422, dated 15th October, 1915, with reference to appointment of Assistant Paymasters in charge.

P.C. 2267, dated 25th September, 1915, with reference to regulations for payment of "Detained Pay."

P.C. 93/2151, dated 17th September, 1915, with reference to allowances to officers and men employed on coding and decoding duties, etc.

P.C. 1712, dated 21st July, 1915, with reference to scheme of pensions for officers and men of the Royal Canadian Forces, etc.

CONTENTS OF VOLUME 28—*Continued.*

P.C. 748, dated 13th April, 1915, with reference to institution of the ratings of rangetaker first and second class in the Royal Canadian Navy.

P.C. 58/1470, dated 24th June, 1915, with reference to increase in amount of Separation Allowance to a motherless child from 3s. to 5s.

P.C. 85/1158, dated 20th May, 1915, with reference to revision of amounts payable on account of Separation Allowance to dependents of Royal Canadian Naval Permanent Ratings.

P.C. 756, dated 13th April, 1915, with reference to payment of Allowances to officers of the Royal Naval Canadian Volunteer Reserve for performance of duties which carry with them an Allowance to officers of the Royal Canadian Navy. Presented by Hon. Mr. Hazen, January 17, 1916.. .. ..*Not printed.*

42. Copies of Proclamations, Orders in Council and Documents relating to the European War. Presented by Sir Robert Borden, January 18, 1916.. .. ..*Not printed.*

42*a*. First Supplement to Copies of Proclamations, Orders in Council and Documents relating to the European War. Presented by Sir Robert Borden, January 18, 1916..*Not printed.*

43. Orders in Council relating to the European War, from 29th April, 1915, to 12th January, 1916, both inclusive. Presented by Sir Robert Borden, January 18, 1916..*Not printed.*

44. Copy of New Rules of Court passed by the Judges of the Supreme Court of Alberta, under the authority of Section 576 of the Criminal Code, at meeting of 27th November, 1915. Presented by Hon. Mr. Meighen, January 20, 1916.. .. ..*Not printed.*

45. Account of the average number of men employed on the Dominion Police Force during each month of the year 1915, and of their pay and travelling expenses, pursuant to Chapter 92, Section 6, Subsection 2, of the Revised Statutes of Canada. Presented by Hon. Mr. Doherty, January 20, 1916.. .. ..*Not printed.*

46. Regulations under "The Destructive Insect and Pest Act," pursuant to Section 9, Chapter 31 of 9-10 Edward VII. Presented by Hon. Mr. Burrell, January 24, 1916...*Not printed.*

47. Return of Orders in Council which have been published in the *Canada Gazette* and in the British Columbia *Gazette*, between 12th January, 1915, and the 31st December, 1915, in accordance with provisions of Subsection (*d*) of Section 38 of the regulations for the survey, administration, disposal and management of Dominion Lands within the 40-mile Railway Belt in the Province of British Columbia. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

48. Return of Orders in Council which have been published in the *Canada Gazette*, between 12th January, 1915, and the 31st December, 1915, in accordance with the provisions of Section 77 of "The Dominion Lands Act," Chapter 20 of the Statutes of Canada, 1908. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

49. Return of Orders in Council which have been published in the *Canada Gazette*, between the 16th January, 1915, and the 31st December, 1915, in accordance with the provisions of "The Forest Reserves and Park Act," Section 19 of Chapter 10, 1-2 George V. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

50. Return of Orders in Council which have been published in the *Canada Gazette*, between the 12th January, 1915, and the 31st December, 1915, in accordance with the provisions of Section 5 of "The Dominion Lands Survey Act," Chapter 21, 7-8 Edward VII. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

51. Return of Orders in Council which have been published in the *Canada Gazette*, between the 12th January, 1915, and the 31st December, 1915, in accordance with the provisions of Chapter 47, 2 George V, entitled "The Railway Belt Water Act." Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

52. Return of Orders in Council passed between the 16th January, 1915, and the 31st December, 1915, approving of regulations and forms prescribed in accordance with the provisions of Section 57 of the Irrigation Act, Chapter 61, Revised Statutes of Canada, 1906, as amended by Chapter 38, 7-8 Edward VII. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

53. Return of Orders in Council passed under the provisions of Section 18 of Chapter 63, Revised Statutes of Canada, "An Act to provide for the Government of the Yukon Territory." Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

54. Return showing lands sold by the Canadian Pacific Railway Company during the year which ended on the 30th September, 1915. Presented January 25, 1916...*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

55. Return called for by Section 88 of Chapter 62, Revised Statutes of Canada, requiring that the Minister of the Interior shall lay before Parliament, each year, a return of liquor brought from any place out of Canada into the Territories by special permission in writing of the Commissioner of the Northwest Territories. Presented by Hon. Mr. Roche, January 25, 1916.. .. ..*Not printed.*

56. Copies of General Orders promulgated to the Militia for the period between November 25, 1914, and December 24, 1915. Presented by Sir Sam Hughes, January 26, 1916.
Not printed.

57. Statement of Superannuation and Retiring Allowances in the Civil Service during the year ending 31st December, 1915, showing name, rank, salary, service, allowance and cause of retirement of each person superannuated or retired, also whether vacancy is filled by promotion, appointment or by transfer, and the salary of any new appointee. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

58. Statement of Expenditure on account of "Miscellaneous Unforeseen Expenses," from the 1st April, 1915, to the 12th January, 1916, in accordance with the Appropriation Act of 1915. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

59. Statement of the affairs of the Royal Society of Canada, for the year ended April 30, 1915. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

60. Report and Statement of Receipts and Expenditures of the Ottawa Improvement Commission to March 31, 1915. Presented by Sir Thomas White, February 1, 1916.
Not printed.

61. Statement of Receipts and Expenditures of the National Battlefields Commission to 31st March, 1915, as required by 7-8 Edward VII, Chapter 57, Section 12. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

62. Statement of Temporary Loans, Dominion of Canada, outstanding December 31, 1915. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

63. Statement of Governor General's Warrants issued since the last session of Parliament on account of 1915-16. Presented by Sir Thomas White, February 1, 1916..*Not printed.*

64. Statement of Treasury Board over-ruling, under Section 44, Consolidated Revenue and Audit Act. Presented by Sir Thomas White, February 1, 1916.. .. ..*Not printed.*

65. Detailed Statement of all remissions and refunds of the tolls or duties for the fiscal year ending 31st March, 1915. Presented by Hon. Mr. Blondin, February 2, 1916.
Not printed.

66. Return to an Order of the House of the 8th March, 1915, for a return showing the quantity of Oliver equipments purchased since 1st August, 1914, the persons from whom they were purchased, the price paid to each contractor, and the dates of their delivery. Also a copy of all complaints received from any quarter in regard to the equipment, and of any action, departmental or otherwise, taken in regard to the same. Presented 3rd February, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

67. Return to an Order of the House of the 1st March, 1915, for a return showing the amount of dredging done in the county of Inverness since 1896, up to the present; where such dredging was done, the quantity of dredging done in each place, and dates on which such dredging was done, also the cost in each case of such dredging. Presented February 3, 1916.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

68. Return to an Order of the House of the 17th March, 1915, for a copy of all reports, correspondence and other communications between the Department of Customs and Auguste Desjardins, of St. Denis de Kamouraska, since his appointment as a preventive officer of that Department. Presented by Hon. Mr. Reid, February 3, 1916.—*Mr. Lapointe (Kamouraska)*.. .. ..*Not printed.*

69. A detailed statement of all bonds or securities registered in the Department of the Secretary of State of Canada, since last return (15th February, 1915) submitted to the Parliament of Canada under Section 32 of Chaper 19 of the Revised Statutes of Canada, 1906. Presented by Hon. Mr. Blondin, February 3, 1916.. .. ..*Not printed.*

70. Annual return respecting Trade Unions under Chapter 125, R.S.C., 1906. Presented by Hon. Mr. Blondin, February 3, 1916.. .. ..*Not printed.*

71. Return to an Order of the House of the 22nd March, 1915, for a copy of all letters, despatches, correspondence, petitions, recommendations, tenders, etc., relating to the purchase of the land for the Quarantine de Lévis. Presented February 3, 1916.—*Mr. Bourassa*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

72. Certified copy of a report of the Committee of the Privy Council, approved by His Royal Highness the Governor General on the 7th February, 1916, appointing Robert A. Pringle, of the city of Ottawa, one of His Majesty's counsel learned in the law, and His Honour D. B. MacTavish, Judge of the County Court for the County of Carleton, a Commission, under the Inquiries Act, to conduct an inquiry into and concerning the origin of the recent disastrous fire which destroyed the Parliament Buildings at Ottawa. Presented by Sir Robert Borden, February 7, 1916.. .. ..*Not printed.*

72*a*. Report of the Royal Commission appointed to inquire into the origin of the fire which destroyed the Central Parliament Building at Ottawa, on Thursday, 3rd February, 1916. Also copy of evidence taken before the Royal Commission appointed to inquire into the origin of the fire which destroyed the Central Parliament Building at Ottawa, on Thursday, 3rd February, 1916. Presented by Hon. Mr. Rogers, May 16, 1915.
Printed for sessional papers only.

73. Copy of Order in Council, No. P.C. 162, dated 29th January, 1916,—Establishment of the rank of wireless operator in the Royal Naval Canadian Volunteer Reserve and regulations for the proper government thereof. Presented by Hon. Mr. Hazen, February 7, 1916.. .. ..*Not printed.*

74. Copy of Orders in Council, No. P.C. 183, dated 31st January, 1916,—Regulations governing the payment of allowance to officers of the Royal Canadian Naval Service acting as interpreters. Presented by Hon. Mr. Hazen, February 7, 1916.. .. ..*Not printed.*

74*a*. Copy of Order in Council No. P.C. 54/601, dated 16th March, 1916, authorizing payment of messing allowance to Royal Naval Reserve Officers. Presented by Hon. Mr. Hazen, March 29, 1916.. .. ..*Not printed.*

75. Communication from the Acting High Commissioner for Canada in London, Sir George Perley, enclosing a report on the Canadian Hospital at Dinard by Dr. Rallier du Baty, Chief Surgeon at the said hospital. Presented by Sir Robert Borden, February 7, 1916.
Printed for sessional papers only.

76. A communication from the Right Honourable A. Bonar Law, Colonial Secretary, to His Royal Highness the Governor General, enclosing a copy of the Imperial Parliamentary Debates (House of Commons, 10th January) on a resolution which was adopted by that House, as follows:—"That with a view to increasing the power of the Allies in the prosecution of the war, His Majesty's Government should enter into immediate consultation with the Governments of the Dominions in order with their aid to bring the whole economic strength of the Empire into co-operation with our Allies in a policy directed against the enemy." Presented by Sir Robert Borden, February 7, 1916.
Printed for distribution and sessional papers

77. Correspondence between the Canadian Manufacturers' Association and the Prime Minister 1914-1915. Presented by Sir Robert Borden, February 7, 1916.. .. .. ..*Not printed.*

78. Correspondence between the International Nickel Company and the Prime Minister. Presented by Sir Robert Borden, February 7, 1916.. .. ..*Not printed.*

79. Return to an Order of the House of the 7th February, 1916, for a copy of all correspondence and reports on the claims of Sealers of British Columbia under the last treaty with the American Republic. Presented February 9, 1916.
Printed for sessional papers only.

80. Certified copy of a report of the Committee of the Privy Council, approved by His Royal Highness the Governor General on the 15th April, 1915, giving authority for the renewal, from the 31st March, 1916, of the agreement between the Dominion Government and the Province of Alberta for the service of the Royal Northwest Mounted Police in that province. Presented by Sir Robert Borden, February 10, 1916.
Printed for sessional papers only.

81. Certified copy of a report of the Committee of the Privy Council, approved by His Royal Highness the Governor General on the 21st May, 1915, giving authority for the renewal, from the 31st March, 1916, of the agreement between the Dominion Government and the province of Saskatchewan, for the services of the Royal Northwest Mounted Police in that province. Presented by Sir Robert Borden, February 10, 1916.
Printed for sessional papers only.

82. Return to an Order of the House of the 8th February, 1916, for a copy of all letters, papers, and other documents relating to the application of Wasyl Pinianski for the patent of the southwest quarter section 5, township 25, range 4, west second principal meridian, Office File No. 1752484. Presented February 16, 1916.—*Mr. MacNutt*... ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

83. Return to an Order of the House of the 3rd February, 1916, for a copy of all affidavits, letters, telegrams and other correspondence during the years 1914 and 1915 in reference to the S.E. 7-1-13 west 2nd meridian, now the 160-acre homestead of Frank Strubell, between the Department of the Interior or the Minister, or any officer of the Department and the Land Office at Weyburn and Estevan, and with all parties who endeavoured to secure or assisted in securing homestead entry for the said land. Presented February 16, 1916.—*Mr. Turriff*.. .. ..*Not printed.*

84. Report of the Board of Inquiry appointed to make an investigation into the increase in the cost of living in Canada and the causes which have occasioned or contributed to such result. Presented by February 16, 1916.. .. .. ..*Printed for distribution.*

84*a*. Synopsis of exhibit by the Statistical Branch, Department of Labour, laid before the Board of Inquiry into the Cost of Living, 1915. Presented by Sir Robert Borden, February 29, 1916.. .. ..*Printed for distribution.*

85. Report of delegation representing the Government of Canada at the Ninth Annual Congress held under the auspices of the World's Purity Federation at San Francisco, July 18-24, 1915. Presented by Sir Robert Borden, February 16, 1916.. .. ..*Not printed.*

86. Return to an Address to His Royal Highness the Governor General, of the 7th February, 1916, for a copy of all Orders in Council, letters and correspondence which led to the convening of the conference of local governments which took place in Ottawa during the month of October last; together with all the proceedings and resolutions of the said conference. Presented February 17, 1916.—*Sir Wilfrid Laurier*.. .. .. ..*Not printed.*

87. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams and other documents relating to the purchase by the Government of the several parcels of land now comprised in the Experimental Farm at Rosthern, Saskatchewan. Presented February 22, 1916.—*Mr. McCraney*.. .. ..*Not printed.*

88. Return to an Order of the House, of the 7th February, 1916, for a return showing the names and post office addresses of all applicants for bounty under the Deep Sea Fisheries Act, from the districts of Ecum Secum, Marie Joseph, Spanish Ship Bay, and Liscombe, county of Guysborough, N.S., for the years 1912, 1913, 1914 and 1915, distinguishing between applications that have been accepted and the bounty paid, and those that have been rejected, and also the reasons for such rejections, if any. Presented February 22, 1916.—*Mr. Sinclair*.. .. ..*Not printed.*

89. Return to an Order of the House of the 3rd February, 1916, for a return showing the fractional areas of homestead lands, or otherwise, in the province of Saskatchewan, sold in the year 1915, the name of the purchaser, and the price paid in each case. Presented February 22, 1916.—*Mr. Martin (Regina)*.. .. ..*Not printed.*

90. Return to an Order of the House, of the 7th February, 1916, for a return showing a copy of the prospectus, rates of interest, the effective interest, the net yield, commission charges, printing charges and other charges, in connection with the Government Domestic Loan of one hundred million dollars, and also in connection with the loan of forty-five million dollars made at New York in 1915. Presented February 22, 1916.—*Mr. Maclean (Halifax)*.. .. ..*Not printed*

91. Return to an Order of the House of the 7th February, 1916, for a return showing the number of subscribers in the Government Domestic Loan of one hundred million dollars which were in the sum of $1,000 or under, and the number of other subscriptions in multiples of $1,000. Presented February 22, 1916.—*Mr. Maclean (Halifax)*.
Not printed.

92. Return to an Order of the House of the 8th March, 1915, for a return showing:—1. From how many firms or private individuals the Government, or any Department of the Government, has ordered trousers, breeches, and pantaloons since the 1st of July, 1914? 2. The names of these firms? 3. How many trousers, breeches and pantaloons have been ordered from each firm? 4. How many each firm has delivered up to date? 5. How many each firm has yet to deliver? 6. The price each firm is receiving for these trousers, breeches and pantaloons. Presented February 24, 1916.—*Mr. Chisholm (Inverness)* .. ..*Not printed.*

93. Return to an Order of the House of the 8th March, 1915, for a return showing the number of appointments to the Inside Service and to the Outside Service since October, 1911, of persons resident in the county of Wright, the number of dismissals from the service since October, 1911; the number of resignations from the service since above date; with the names of parties at whose request such resignations, if any, were tendered. Presented February 24, 1916.—*Mr. Devlin*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

94. Return to an Order of the House of the 8th April, 1915, for a return showing:—1. The names of the persons who have successfully passed the Civil Service examination in the province of Quebec since the establishment of the Civil Service Commission. 2. The number of such persons who have been called upon to enter the Civil Service. 3. The number in each grade of those who have pased such examinations with success. Presented February 24, 1916.—*Mr. Boulay*.. .. ..*Not printed.*

95. Return to an Order of the House of the 3rd February, 1916, for a copy of all documents, papers and telegrams in any way referring to the application of Aenas McKinnon, of Iron Mines, Inverness County, for the Fenian Raid Veteran Bounty. Presented February 24, 1916.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

95*a*. Return to an Order of the House of the 14th February, 1916, for a copy of all telegrams, letters, petitions and documents of any kind, referring in any way to the application of Anes or Angus McKinnon, of Iron Mines or Orangedale, Inverness County, for the Fenian Raid Bounty. Presented March 3, 1916.—*Mr. Chisholm (Inverness)*. *Not printed.*

96. Return to an Order of the House of the 15th March, 1915, for a copy of the claim of Captain Stephen Paul, owner of the steamer *Rhoda*, for the destruction of his ship, as a wreckage, by the Department of Marine, and of all correspondence with regard to the same. Presented February 24, 1916.—*Sir Wilfrid Laurier*.. .. ..*Not printed.*

97. Return to an Order of the House of the 29th March, 1915, for a copy of all letters and telegrams, or any other written communications which passed between the Minister of Railways and Canals and J. C. Douglas, Esq., M.P.P., of Glace Bay, Nova Scotia, between the 1st of January and the last of December, 1914, and of all letters and telegrams between the Minister of Customs and Public Works, and the Postmaster General, and the said J. C. Douglas during the above period, in respect to the dismissal, appointment or restoration to office of Government officials. Presented February 24, 1916.—*Mr. McKenzie*.. .. ..*Not printed.*

98. Return to an Order of the House of the 3rd February, 1916, for a copy of all reports upon the depths of water in the different locks in the East River of Pictou, improvements, and of all correspondence and recommendations in regard to changes on the plans therefor. Presented February 24, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

98*a*. Supplementary return to an Order of the House of the 3rd February, 1916, for a copy of all reports upon the depths of water in the different locks in the East River of Pictou, improvements, and of all correspondence and recommendations in regard to changes on the plans therefor. Presented March 13, 1916.—*Mr. Macdonald*.. .. .. ..*Not printed.*

99. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams, petitions and other papers relative to the granting of a Conciliation Board to the employees of the Acadia Coal Company, in the county of Pictou, in the autumn of 1915. Presented February 24, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

100. Return to an Order of the House of the 1st March, 1915, for a return showing the number of miles of telegraph lines, and the locations, erected in the county of Inverness, each year since 1896, to the present day, with the cost of each line. Presented February 24, 1916.—*Mr. Chisholm (Inverness)*.. .. ..*Not printed.*

101. Return to an Order of the House of the 3rd February, 1916, for a copy of all tenders, letters, telegrams and contracts relative to a mail contract from Noel to Maitland, in the county of Hants, and relative to the warding of the same under contract. Presented February 24, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

102. Return to an Order of the House of the 22nd March, 1915, for a copy of the petition addressed to the Post Office Department for the establishment of the rural mail delivery route in the county of Shefford, known as Warden No. 1, and of all letters, telegrams reports and other communications connected therewith. Presented February 24, 1916.—*Mr. Boivin*.. .. ..*Not printed.*

103. Return to an Order of the House of the 9th February, 1916, for a return showing the different rural mail routes in the Strathcona constituency, their location and date of establishment, and all rural routes under consideration at the present time. Presented February 24, 1916.—*Mr. Douglas*.. .. ..*Not printed.*

103*a*. Return to an Order of the House of the 16th February, 1916, for a return showing the location of all rural mail routes in the present constituency of Strathcona, the date of their inception, and the location of routes at present under consideration. Presented February 24, 1916.—*Mr. Douglas*.. .. ..*Not printed.*

104. Return to an Order of the House of the 25th March, 1915, for a copy of all letters, papers, petitions, reports and other documents relating to the establishment of a rural mail delivery route, for the purpose of giving postal service to the districts of Hodson and Toney Mills, county of Pictou. Presented February 24, 1916.—*Mr. Macdonald*. *Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

105. Return to an Order of the House of the 3rd February, 1916, for a copy of all correspondence, letters, telegrams and memorials received by the Honourable Postmaster General or the Right Hon. Sir Robert L. Borden, since January 1, 1912, relating to the contract for carrying the mail across Lemon Ferry, in the county of Richmond, N.S., and also of all replies thereto. Presented February 24, 1916.—*Mr. Kyte*.. .. ..*Not printed.*

106. Return to an Order of the House of the 7th February, 1916, for a return showing how many rural mail delivery routes have been opened during the last fiscal year, in what counties, and at what cost in each county. Presented February 24, 1916.—*Mr. Lemieux.* *Not printed.*

107. Return to an Order of the House of the 7th February, 1916, for a copy of all correspondence between the Department of Marine and Fisheries, or any department of Government, and the Pilot Commissioners of the harbour and district of St. Anns, in the county of Victoria, during the years 1914 and 1915, in respect to the removal or dismissal of Daniel Buchanan from the office of pilot of said harbour or district. Presented February 24, 1916.—*Mr. McKenzie*.. .. ..

CONTENTS OF VOLUME 28—*Continued.*

117. Return to an address to His Royal Highness the Governor General of the 7th February, 1916, for a copy of all evidence, reports, memoranda or Orders in Council, relative to the retirement or dismissal from the customs service at the Port of Halifax, of A. J. Crosby, Thomas Lynch and J. B. Naylor. Presented February 25, 1916.—*Mr. Maclean (Halifax)* .. .. ..

CONTENTS OF VOLUME 28—*Continued.*

131. Return to an Order of the House of the 7th February, 1916, for a copy of all letters, telegrams, evidence of witnesses at the investigation, and reports thereon, in relation to the claim of Alexandre D. Doucet, of Beresford, N.B., for cattle killed on the Intercolonial Railroad on May 25, 1915. Presented March 1, 1916.—*Mr. Turgeon.*
Not printed.

132. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams, correspondence and agreements between the Department of Railways and Canals, and any official thereof, including the officials of the Intercolonial Railway, regarding the installation of the McQueen Siding, so-called, at Shediac, in the province of New Brunswick, and the subsequent removal thereof. Presented March 1, 1916.—*Mr. Carvell*.. .. .. .

CONTENTS OF VOLUME 28—*Continued.*

141. Return to an Order of the House of the 7th February, 1916, for a return of all sums of money expended, respectively, during the present fiscal year by the Department of Public Works, chargeable to capital account, for public buildings and harbours and rivers, by provinces, designating in detail the purposes of such expenditure. Presented March 1, 1916.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

142. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams and other documents in connection with the purchase of a site for the post office building at Bear River, N.S. Presented March 1, 1916.—*Mr. Law*.. .. ..*Not printed.*

143. Return to an Order of the House of 7th February, 1916, for a copy of all letters, papers, telegrams, pay-sheets, pay-rolls, receipts and documents of all kinds whatsoever in connection with the extension or repairs on the public breakwater at Port Morien, in South Cape Breton, during 1915. Presented March 1, 1916.—*Mr. Carroll*.. .. ..*Not printed.*

144. Return to an Order of the House of 16th February, 1916, for a copy of all letters, telegrams and correspondence between the Department of Marine and Fisheries, or any official thereof, and any person or persons in reference to the proposed retirement from office of the present keeper of the lighthouse at Cape Jourmain, in the county of Westmorland. Presented March 1, 1916.—*Mr. Copp*.. .. ..*Not printed.*

145. Return to an Order of the House of 7th February, 1916, for a copy of all correspondence between the Department of Militia and Defence or any of its branches, and the Department of Agriculture, in reference to the using of the immigration or quarantine buildings at McNab's Island and Lawlor's Island, Halifax, N.S., for military purposes, and particularly for their use by the 63rd Regiment, Overseas Contingent. Presented March 1, 1916.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

146. Return to an Order of the House of 7th February, 1916, for a return showing the names of all medical officers appointed and employed for immigration or quarantine purposes at Halfax, St. John, Quebec, Montreal, Toronto, Winnipeg, Regina, Calgary, Edmonton, Vancouver and Victoria, together with the date of appointment of each, their salary, and in each case designating whether they or any of them are still in the service of the Government, and when not, the date when the service ceased. Presented March 1, 1916. —*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

147. Return to an Order of the House of the 3rd February, 1916, for a return showing:—1. The names of the different tenderers for the carrying of the mails from the rural boxes established in the counties of l'Assomption and Montcalm down to the present day. 2. The figure of each of such contracts, and the name of the tenderer to whom each of such contracts has been awarded, and for what sum. 3. If any contracts were given without tender. If so, to whom, and for what amount. Presented March 2, 1916.— *Mr. Seguin*.. .. ..*Not printed.*

148. Return to an Order of the House of the 21st February, 1916, for a copy of all correspondence and telegrams exchanged between the Labour Department and the workingmen at Thetford Mines prior, during, or after the last strike in that vicinity, and of all other papers relating thereto. Presented March 2, 1916.—*Mr. Verville*.. .. .. ..*Not printed.*

149. Fenian Raid Bounties—to whom paid in Queens County, N.S.—(*Senate*).. ..*Not printed.*

150. Return to an Address to His Royal Highness the Governor General, of the 3rd February, 1916, for a copy of all Orders in Council passed since 4th August, 1914, dealing with members of the Canadian Expeditionary Forces in the following particulars: Pensions to partially or totally disabled soldiers or their dependents; money allowances or other provision made for the support or care of partially or totally disabled returned soldiers; and pay allowances or other consideration to dependents of soldiers while on active service, and after their return from active service, because of disablement from any cause. Presented March 3, 1916.—*Mr. Oliver*.. .. ..*Printed for sessional papers only.*

151. Return to an Order of the House of the 3rd February, 1916, for a return showing the names of all medical officers employed and designated in the years 1914 and 1915, in the examination of recruits in the county of Pictou, and of any changes in the list of said officers in said period. Presented March 3, 1916.—*Mr. Macdonald*.. ..*Not printed.*

152. Return to an Order of the House of the 4th March, 1915, for a return showing the names and addresses of all persons in Annapolis and Digby Counties, Nova Scotia, to whom the bounty under the Fenian Raid Volunteer Bounty Act has been paid; the names and addresses of all persons from said counties whose applications have been rejected; and the names and addresses of all applicants from said counties whose applications have not been disposed of. Presented March 3, 1916.—*Mr. Law*.. .. ..*Not printed.*

153. Return to an Order of the House of the 19th February, 1915, for a return showing the names and addresses of all persons in South Cape Breton, Nova Scotia, who have been paid Fenian Raid Bounty; the names and addresses of all persons in South Cape Breton, N.S., who have made application for said bounty and who have not yet received it. Presented March 3, 1916.—*Mr. Carroll*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

154. Return to an Order of the House of the 1st March, 1915, for a return showing the names and addresses of all persons who received bounty. Raid Bounty was paid in the county of Halifax, N.S., to date. Presented March 3, 1916.—*Mr. Maclean (Halifax).*
Not printed.

155. Return to an Order of the House of the 31st March, 1915, for a copy of all applications received for Fenian Raid Bounty from residents of the county of Hants, N.S.; also the names of persons who have been paid the bounty and those who have been refused it in said county; with the reasons for refusal, and showing the number of applications that have not yet been dealt with. Presented March 3, 1916.—*Mr. Chisholm (Inverness)*.. .. .. .

CONTENTS OF VOLUME 28—*Continued.*

168. Return to an Order of the House of the 16th February, 1916, for a copy of all letters, petitions, correspondence and telegrams, exchanged between the Government, its resident enginer of the district, and all other persons concerning the construction of a bridge between Ile Perrot and Ste. Ann de Bellevue, and Ile Perrot and Vaudreuil. Presented March 7, 1916.—*Mr. Boyer*.. .. ..*Not printed.*

169. Return to an Order of the House of the 21st February, 1916, for a copy of all letters and correspondence between A. Bellemare, Esq., M.P., and the Government, or any member thereof, in connection with the construction of the post office at Louiseville. Presented March 7, 1916.—*Mr. Gauvreau*.. .. ..*Not printed.*

170. Return to an Order of the House of the 21st February, 1916, for a return showing the amounts spent for the furnishing of the office of the Hon. E. Patenaude, Minister of Inland Revenue; with a copy of all invoices. And also a statement of the amounts spent for the furnishing of the office of the Hon. W. B. Nantel, when Minister of Inland Revenue; with a copy of all invoices. Presented March 7, 1916.—*Mr. Lanctot.*
Not printed.

171. Return to an Order of the House of the 3rd February, 1916, for a copy of all documents, title deeds, papers, notarial deeds or private writings in connection with the sale, donation or transfer, by the estate of Alex. Fraser, of Rivière du Loup, to the Government or the Railway Department, for the Intercolonial, the lot of land or part of the lot of land, at the east of the Intercolonial bridge at Rivière du Loup, at a place called Gauvreau Yard; also of all correspondence in this connection. Presented March 7, 1916.—*Mr. Gauvreau*.. .. ..

CONTENTS OF VOLUME 28—*Continued.*

183. Return to an Address to His Royal Highness the Governor General of the 7th February, 1916, for a copy of the Order in Council or departmental order dismissing Mr. Bayfield from the position of Superintendent of Dredging in British Columbia; and also a copy of the Order in Council or departmental order appointing J. L. Nelson in his place. Presented March 13, 1916.—*Mr. Pugsley*.. .. ..*Not printed.*

184. Return to an Order of the House of the 23rd February, 1916, for a copy of all reports and documents concerning the surveys made by the Federal Government during the autumn of 1914 of Lake Matapedia and the river of the same name down to the village of Amqui. Presented March 13, 1916.—*Mr. Lapointe (Kamouraska)*.. ..*Not printed.*

185. Return to an Order of the House of the 13th March, 1916, for a copy of the pension list in force in Canada for disabled soldiers and of all petitions, letters or other documents relating to the amendment or readjustment of the same. Presented March 14, 1916.—*Printed for distribution and sessional papers.*

186. Return to an Order of the House of the 16th February, 1916, for a copy of all letters, petitions, correspondence and telegrams between the Government, the engineers, and all other persons concerning the building of the post office at Rigaud; also of the amounts of money paid to divers persons for such building, furnishing, the land, the care of the grounds and other works. Presented March 15, 1916.—*Mr. Boyer*.. .. ..*Not printed.*

187. Return to an Order of the House of the 6th March, 1916, for a return showing the different rural mail routes in the constituency of Medicine Hat, with their location and date of establishment; and also all rural mail routes now being established or under consideration at the present time in the same constituency. Presented March 15, 1916. —*Mr. Buchanan*.. .. ..*Not printed.*

187*a*. Return to an Order of the House of the 20th March, 1916, for a return showing:—1. The reason for the delay in the establishment of the rural mail routes, reported under consideration, in the constituency of Medicine Hat. 2. When these routes were first applied for. 3. If the applications possessed the required number of signatures. 4. If tenders have been invited. If so, for what routes. 5. Why the lowest tenders were not accepted, and the routes established. 6. If any tenders are being invited for these routes. 7. If there is a likelihood of any of these routes being operated immediately. Presented March 27, 1916.—*Mr. Buchanan*.. .. ..*Not printed.*

188. Return to an Order of the House of the 21st February, 1916, for a copy of all letters, telegrams, investigations and reports relating to the dismissal of Joseph Fleming, conductor Intercolonial Railway, and in regard to his reinstatement. Presented March 16, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

189. Return to an Order of the House of the 18th March, 1915, for a copy of all petitions, telegrams, communications and other documents relating to the dismissal of Mr. Hubert Paquin, postmaster of St. Gilbert de Portneuf. Presented March 16, 1916.—*Mr. Delisle. Not printed.*

190. Return to an Order of the House of the 16th February, 1916, for a copy of all letters, petitions, correspondence and telegrams, exchanged between the Government, its Inquiry Commissioner, Mr. G. H. Bergeron, and all other persons, concerning the inquiry, the dismissal and replacing of the postmasters of the different post offices mentioned below; and of all correspondence relating to the appointments of the present postmasters who replace the former ones, who had been either dismissed or replaced for one reason or another:—St. Lazare Village, Vaudreuil Station, Pointe Fortune, Val des Eboulis, Mont Oscar, St. Justine de Newton, Ste. Marthe. Presented March 16, 1916.—*Mr. Boyer. Not printed.*

191. Dismissal of Mr. Chisholm, Inspector of Indian Agencies, Saskatchewan.—(*Senate*). *Not printed.*

192. Return to an Order of the House of the 28th February, 1916, for a return showing:—1. The names, rank and military qualifications of the officers on the Headquarters Staff of the 1st, 2nd and 3rd Divisional Areas, including those on Staffs of Camps and Schools of Instruction, on October 1, 1915. 2. The names of those of the above who on that date had volunteered, taken the oath and been attested for overseas service. Presented March 20, 1916.—*Mr. Proulx*.. .. ..*Not printed.*

193. Return to an Order of the House of the 21st February, 1916, for a return showing:—1. How many persons have been employed by the Department of Militia since the beginning of the war in the examining, appraising or testing of materials, such as clothing, harness, etc., purchased for military purposes. 2. How many of such employees are practical trades people, experts, or otherwise experienced persons in the respective callings connected with the various materials as purchased. Presented March 20, 1916.—*Mr. Verville*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

194. Return to an Order of the House of the 6th March, 1916, for a copy of all telegrams, letters, petitions and documents of all kinds referring in any way to the application of Mrs. Flora McIntyre, of River Dennis, Inverness County, N.S., for the Fenian Raid Veteran Bounty of her late husband, Angus McIntyre, late of River Dennis. Presented March 20, 1916.—*Mr. Chisholm (Inverness)*. . . . . *Not printed.*

195. Return to an Order of the House of the 13th March, 1916, for a return showing:—1. The names, dates of appointment, post office addresses at time of appointment, and former occupations of the censors employed by the Militia Department at Louisburg and North Sydney, Nova Scotia. 2. The names of all the said censors who are also decoders, and the names and addresses of all who are employed in the censorship service at the above points. 3. The amount paid to each censor or decoder since the 4th of August, 1914, up to the 1st February, 1916, or to any party or person in connection with the censorship or decoding services at the above places. Presented March 20, 1916.—*Mr. McKenie.*
Not printed.

196. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams, agreements and all other papers relative to the creation of a Board of Conciliation, during the year 1915, under the Industrial Disputes Investigation Act in regard to the employees of the Nova Scotia Steel Company, in the county of Pictou. Presented March 20, 1916.—*Mr. Macdonald*. . . . . *Not printed.*

197. Return to an Order of the House of the 6th March, 1916, for a list of the employees in the Dominion Police Force, with the salary of each of them. Presented March 20, 1916. —*Mr. Boulay*. . . . . *Not printed.*

198. Return showing:—1. Whether the Government have taken cognizance of the following article published in the Montreal "Gazette" on November 1, 1915:—"Canadian Help Comes from Sale of Gift Flour. Foodstuffs not Needed by the English Poor were Bought for Belgian Relief.—Funds to Aid East Coast.—Hon. Walter Long Suggested to Canadian Government that $750,000 be Allotted, and Latter Agreed.—(Special cable from the "Gazette's" resident staff correspondent.)

"London, October 31,—'Canada's aid to the east coast towns of England, which are suffering through the war, is the subject of some misconception,' said Sir George Perley to-day. In a statement in the Commons, Hon. Walter Long said that the necessary funds for a Government scheme of help for hotel and lodging house keepers had been generously provided by the Canadian Government. This gave rise to the idea that the Dominion was taking a new step, but the fact is that no money is coming from Canada. Of the flour sent by Canada a year ago to relieve distress in England, very little was distributed, as poverty was in no way abnormal. Some 400,000 bags of this flour were transferred to the American committee for Belgian relief, which purchased them. The money paid for this flour being in the hands of the Local Government Board, Hon. Walter Long, as President of the Board, suggested to Sir George Perley that this might be utilized for the relief of the east coast towns where the season had been ruined owing to the lack of railway facilities and the disinclination of the public to visit the east coast because of the possibility of German naval or aerial raids. The Dominion Government acquiesced in this proposal, and the sum of $750,000, part of the proceeds of the sale of the flour, has now been allotted for this purpose. Canada's generosity will therefore go to alleviate the distress of a large number of better-class people, who are direct sufferers from the war, instead of the destitute poor, for whom it was intended, but who, it develops, were not in need of it." 2. Whether the said article is accurate. If not, in what respect it is inaccurate. Presented March 20, 1916.—*Mr. Papineau.*
Not printed.

198*a*. Return showing:—1. Whether the Government is aware that the following extract from an article was published on the 12th January, 1915, in the Montreal "Gazette":—

"Distress Caused in England by War is Negligible.—Comparatively Small Portion of Colonial Gifts Used for National Relief.—Much Went to Belgians.—War Office also took Large Share.—Salvation Army has Scheme Requiring Canadian Co-operation.—(Special cable from the "Gazette's" resident staff correspondent.)

"London, January 11.—Very satisfactory evidence of the comparative absence in England of any distress caused by the war is furnished by a report on the special work of the Local Government Board arising out of the war, which was issued to-day as a White Paper. The action by Noel Kershaw, dealing with the disposition of the gifts from the Colonies, shows that only a small part of the goods allocated has been required for relieving the distress of civilians.

"The following is the disposition of the 940,530 bags of flour received from Canada: To the local committees for the relief of distress, 90,474; to the Belgian Refugees Committees, 1,691; transferred to the War Office, 99,760; further offer to the War Office, 300,000; to the Belgian Relief Commission, 443,886; sold, owing to damage, 4,719." 2. Who had charge of accepting delivery and the shipping of this flour. 3. Whether the Government have any information of the shortage of 59,430 bags of flour, alleged in said article. If not, what became of the flour that was short. Presented March 20, 1916.—*Mr. Papineau*. . . . . *Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

199. Return to an Order of the House of the 6th March, 1916, for a return showing the amounts contributed from the constituency of Medicine Hat for machine guns, and by whom contributed or forwarded. Presented March 21, 1916.—*Mr. Buchanan*.. ..*Not printed.*

200. Return to an Order of the House of the 13th March, 1916, for a copy of all letters, petitions, recommendations and other documents in the possession of the Post Office Department relating to the appointment of the postmaster at West Roachdale, Guysbo ough County, Nova Scotia, to take the place of J. H. McGuire, deceased. Presented March 21, 1916.—*Mr. Sinclair*.. .. ..*Not printed.*

201. Return to an Order of the House of the 28th February, 1916, for a return showing in detail the payment or payments amounting to $647.50, paid to P. A. Stoddart, fishery guardian, Shelburne County, N.S., during the year ending March 31, 1915. Presented March 21, 1916.—*Mr. Kyte*.. .. ..*Not printed.*

202. Return to an Order of the House of the 28th February, 1916, for a copy of all correspondence, letters, telegrams and documents of all kinds relating to the chartering of the vessel *Starling*, by the Department of Marine and Fisheries. Presented March 21, 1916. *Mr. Kyte*.. .. ..*Not printed.*

203. Return to an Order of the House of the 7th February, 1916, for a copy of all documents, letters, messages, correspondence and reports concerning a conference between the Minister of Agriculture and certain representatives of the Mennonite Church in or about July, 1873, and referred to in a certain letter dated 23rd July, 1873, signed by P. M. Lowe, Secretary of the Department of Agriculture, and addressed to Messrs. David Klassen, Jacob Peters, Heinrich Wiebe and Cornelius Toews, delegates from Southern Russia. Presented March 21, 1916.—*Mr. McCraney*.. .. ..*Not printed.*

204. Return to an Order of the House of the 13th March, 1916, for a copy of all letters, telegrams, petitions, memorials and other documents relating to the subsidizing by the Government of the construction of ships in British Columbia, or of ships when built; or as to the laying down or constructing or assisting in the construction in British Columbia of twenty-five ships by the Government, or as to assisting by subsidies or otherwise in the construction of ships in the Dominion. Presented March 23, 1916.—*Mr. Macdonald.* *Not printed.*

205. Return to an Order of the House of the 13th March, 1916, for a copy of the affidavit of David W. McLean, Windsor, N.S., to whom Warrant No. 25737 was issued for Fenian Raid Bounty, and also a copy of all correspondence and other documents relating to the payment of the same. Presented March 23, 1916.—*Mr. Macdonald*.. .. .. ..*Not printed.*

206. Return to an Order of the House of the 9th March, 1916, for a return showing:—1. The amount collected in wharfage on goods landed on Government wharves in the county of Victoria, at Neils Harbour, Ingonish, Englishtown, South Gut, Baddeck, Little Narrows, Nyaiga, and Big Bras d'Or. 2. The amount collected at each of the above places, by whom collected, and how much returned to the Government in each case. Presented March 27, 1916.—*Mr. McKenzie*.. .. ..*Not printed.*

207. Return to an Order of the House of the 20th March, 1916, for a return showing:—The names of the 54 Canadian officers employed in the Canadian Pay and Record Office, London, and amounts per month paid to each of them. Presented March 27, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

208. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams, petitions, directions and other documents relative to the surveys for a railway under the Railway Department, which have been carried on during the past summer, at points east and west from Sunnybrae, in the county of Pictou. Presented March 27, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

209. Return to an Order of the House of the 21st February, 1916, for a copy of all papers, agreements, letters, telegrams and other documents relating to the proposal to purchase, lease, or use of, the railway known as the Vale Railway, county of Pictou, and to the operation of the same by the Railway Department. Presented March 27, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

210. Return to an Order of the House of the 7th February, 1916, for a return showing the number and purpose of all commissions appointed by the Government since 1911, and the cost of each, together with names of the various members of such commissions. Presented March 27, 1916.—*Mr. Pardee*.. .. ..*Not printed.*

211. Return to an Order of the House of the 6th March, 1916, for a copy of all correspondence, letters, telegrams and documents relating to the dismissal or resignation of Dr. W. T. Patton from the service of the Veterinary Inspection Branch of the Department of the Interior, and his re-appointment and his later dismissal or resignation. Presented March 27, 1916.—*Mr. Buchanan*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

211*a*. Return to an Order of the House of the 3rd April, 1916, for a copy of all correspondence, letters, telegrams and documents relating to the dismissal or resignation of Dr. W. T. Patton, from the service of the Veterinary Inspection Branch of the Department of Agriculture at Coutts, Alberta, and his re-appointment and later dismissal or resignation. Presented May 10, 1916.—*Mr. Buchanan*.. .. ..*Not printed.*

212. Return to an Order of the House of the 28th February, 1916, for a copy of all accounts, telegrams, letters, bills of costs and other documents relating to the case of J. P. Dionne against the King, before the Exchequer Court, in which case Mr. Leo Bérube was attorney and Mr. E. H. Cimon was counsel, both being lawyers of Fraserville. Presented March 27, 1916.—*Mr. Gauvreau*.. .. ..*Not printed*

212*a*. Return to an Order of the House of the 5th April, 1916, for a copy of all telegrams and letters from Leo Berube, lawyer, M.P.P., to the Minister of Justice, relating to the production of the official and public documents asked for by C. A. Gauvreau, M.P., in the case of J. P. Dionne vs. The King, and of any answers of the Minister of Justice to such telegrams and letters. Presented April 10, 1916.—*Mr. Gauvreau*.. .. ..*Not printed.*

213. Return to an Address to His Royal Highness the Governor General, of the 7th February, 1916, for a copy of all correspondence with the Imperial authorities in connection with the purchase of horses, and the prohibiting of the export of horses. Presented March 27, 1916.—*Sir Wilfrid Laurier*.. .. ..*Not printed.*

214. Return to an Order of the House of the 1st March, 1916, for a copy of all correspondence, telegrams, reports and documents of all kinds relating to the visits of a fair wage officer to New Glasgow, N.S., in connection with the schedule of wages of men employed in works making shells at that place. Presented March 28, 1916.—*Mr. Macdonald.*
Not printed.

215. Copy of Order in Council P.C. No. 634, dated 24th March, 1916, *re* the prohibition of the exportation of certain goods including nickel, nickel ore and nickel matte, to certain foreign ports. Presented by Sir Robert Borden, March 28, 1916.
Printed for sessional papers only.

216. Return to an Order of the House of the 6th March, 1916, for a copy of all correspondence, accounts, vouchers, memoranda, etc., relating to the construction of a launch way and boat house at Bear Cove Beach, Halifax County, N.S., and completed in 1914. Presented March 29, 1916.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

217. Return to an Order of the House of the 6th March, 1916, for a detailed statement of the expenditure last year at McNair's Cove, Nova Scotia, giving the names of the workmen, the number thus employed, the amount paid to each; also the amount paid for supplies and material, and the names of the persons to whom the same was paid. Presented March 29, 1916.—*Mr. Chisholm (Antigonish)*.. .. ..*Not printed.*

218. Return to an Order of the House of the 6th March, 1916, for a copy of all correspondence, accounts, vouchers, receipts, etc., in connection with the construction of a wharf at Shad Bay, Halifax County, N.S., in 1914 and 1915. Presented March 29, 1916.—*Mr. Maclean (Halifax)*.. .. ..*Not printed.*

219. Return to an Order of the House of the 16th March, 1916, for a return showing:—1. Whether the Government has received any complaints as to the manner of supplying clothing to the Royal Military College, or as to its fit, workmanship or materials employed, or as to any delay in furnishing the cadets with clothing. 2. If so, from whom such complaints have been received. 3. On what grounds. 4. What form the complaint was in. 5. The nature of the complaint. 6. If the Government is aware as to whether or not there has been dissatisfaction as to the fit, workmanship and materials employed, or as to any delay in furnishing the cadets with clothing. 7. If it is true, as alleged, that the late Commandant of the Royal Military College, Colonel Crowe, before he left, recommended a change of system for the supply of clothing, and outlined the features of such a system. 8. If so, the details of the plan suggested. 9. To what extent the plan suggested by Colonel Crowe was adopted. If not adopted, why not. 10. Whether the present Commandant of the Royal Military College made any suggestions as to a change in the system of supplying clothing to the cadets. 11. If so, the changes which he suggested. Presented March 30, 1916.—*Mr. Carvell.*
Not printed.

220. Escape of alien enemies from detention camps at Amherst, N.S.—(*Senate*)..*Not printed.*

221. Return to an Order of the House of the 21st February, 1916, for a copy of all letters, petitions, papers, telegrams, tenders and other documents relating to the establishment of a rural mail route from Alma, through Sylvester and Loch Broom, and as to the closing of the post offices at Sylvester and Loch Broom. Presented March 31, 1916.—*Mr. Macdonald*.. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

222. Return to an Order of the House of the 3rd February, 1916, for a copy of all petitions, letters, papers, telegrams, tenders and other documents relating to the establishment of rural mail route from Scotsburn to North Scotsburn, Rogers Hill and Hardwood Hill, and as to the closing of any post offices on said route. Presented March 31, 1916.—*Mr. Macdonald*.. .. .. .

CONTENTS OF VOLUME 28—*Continued.*

232. Return to an Order of the House of the 15th March, 1916, for a copy of all letters, telegrams and petitions in the possession or under the control of the Post Office Department having reference to the dismissal of Postmaster McRitchie at North River Centre, Victoria County, Nova Scotia, and to the appointment of Neil McLeod in his place. Presented April 5, 1914.—*Mr. McKenzie*.. .. ..*Not printed.*

233. Return to an Order of the House of the 27th March, 1916, for a copy of all petitions, correspondence, telegrams, recommendations and other papers or documents in the possession of the Postmaster General or his department, relating to the dismissal of James Hall, Postmaster at Milford Haven Bridge, Guysborough County, Nova Scotia, and the appointment of Guy O'Connor, as his successor. Presented April 5, 1916.—*Mr. Sinclair.* *Not printed.*

234. Return to an Order of the House of the 7th February, 1916, for a report showing the apportioning of electoral polling divisions in Manitoba, made by judges under authority of the Dominion Elections Act, 7-8 Edward VII, Chapter 26. Presented April 5, 1916.—*Sir Wilfrid Laurier*.. .. ..*Not printed.*

235. Return to an Order of the House of the 23rd February, 1916, for a copy of all profiles, reports, correspondence and all documents concerning the construction of a viaduct at Amqui, on the Intercolonial Railway, at the place called Traverse Dubé, Dubé Crossing; also of the plans of properties belonging to the Intercolonial Railway at Amqui, and of the land leased to the Municipality of Amqui, with a copy of the lease affecting such land. Presented April 5, 1916.—*Mr. Lapointe* (*Kamouraska*).. .. ..*Not printed.*

236. Return to an Order of the House of the 20th March, 1916, for a return showing the number of horses bought for remounts in Alberta, the persons from whom they were purchased, and the amount paid for each horse. Presented April 6, 1916.—*Mr. Buchanan.* *Not printed.*

237. Return to an Order of the House of the 15th March, 1916, for a return showing:—1. Who has been furnishing food, clothing and other necessary supplies to the soldiers at North Sydney and Sydney Mines, since the 4th August, 1914, to the 1st February, 1916. 2. The names and amounts paid to each, and amounts due to each on 1st February, 1916, over and above what has already been paid. 3. Whether the said supplies of all kinds were obtained or called for by public tender. If so, how the tenders were called, and who the tenderers were. 4. If the contracts for such supplies were always given to the lowest tenderer. 5. The names of those who tendered, and the figures of the tenders in each case. 6. The different methods by which tenders were invited, and for what classes of merchandise or supplies. Presented April 6, 1916.—*Mr. McKenzie*.. ..*Not printed.*

238. Order in Council No. P.C. 680, dated 23rd March, 1916, respecting the application of the Industrial Disputes Investigation Act, 1907, in the case of disputes between employers and employees affecting the delivery of war supplies. Presented by Hon. Mr. Roche, April 6, 1916.. .. ..*Not printed.*

239. Return to an Order of the House of the 13th March, 1916, for a copy of all the evidence taken by the Commission appointed to inquire into claims for damages made against the Militia Department in the town of Sydney Mines, Nova Scotia, and of the report made upon each claim or case, said claims being for damages to lands and other property. Presented April 7, 1916.—*Mr. McKenzie*.. .. ..*Not printed.*

240 Return to an Order of the House of the 1st March, 1916, for a copy of all letters, correspondence and telegrams between the Speaker, the Clerk of the House of Commons, the Civil Service Commission and the Minister of Finance in regard to the proposed appointment of Mr. H. Crossley Sherwood, as Assistant Clerk of Routine and Records, from 1st October, 1914, down to the present date. Presented April 7, 1916.—*Mr. Turriff.* *Not printed.*

240*a*. Supplementary Return to an Order of the House of the 1st March, 1916, for a copy of all letters, correspondence and telegrams between the Speaker, the Clerk of the House of Commons, the Civil Service Commission and the Minister of Finance in regard to the proposed appointment of Mr. H. Crossley Sherwood, as Assistant Clerk of Routine and Records, from 1st October, 1914, down to the present date. Presented April 10, 1916.—*Mr. Turriff*.. .. ..*Not printed.*

241. Return to an Order of the House of the 20th March, 1916, for a copy of all recommendations, letters, telegrams and correspondence relating to the recent appointment of a lightkeeper at Arisaig, N.S. Presented April 7, 1916.—*Mr. Chisholm* (*Antigonish*). *Not printed.*

242. Return to an Order of the Senate dated 31st March, 1916:—For a copy of all papers, letters and all correspondence regarding the passport granted to W. F. Bauman, an alien enemy. The said Bauman is a Bavarian.—(*Senate*).. .. ..*Not printed.*

CONTENTS OF VOLUME 28—*Continued.*

243. Return to an Order of the House of the 3rd February, 1916, for a copy of all letters, telegrams, or other communications sent to the Government or any member or department thereof before 15th August, 1914, pointing out the necessity of granting relief to the settlers in the drouth-stricken area of Alberta. Presented April 10, 1916.—*Mr. Buchanan*.. .. .. .

CONTENTS OF VOLUME 28—*Continued.*

254. Return to an Order of the House of the 21st February, 1916, for a copy of all letters, papers, telegrams and other documents relating to the survey in the harbour of Pictou, for a proposed new bridge, by the Railway Department; and also a statement showing the amounts paid in connection with said survey, the names of the persons to whom paid, and the purposes for which they were paid. Presented April 11, 1916.—*Mr. Macdonald*.. .. .. .

REPORT

OF THE

MINISTER OF AGRICULTURE

FOR THE

DOMINION OF CANADA

FOR THE YEAR ENDING MARCH 31

1915

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY J. DE L. TACHÉ, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1915

[No. 15—1916.]

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REPORT

OF THE

MINISTER OF AGRICULTURE

1914-15

To Field Marshal His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn, K.G., K.T., K.P., etc., etc., etc., Governor General and Commander in Chief of the Dominion of Canada.

May it Please Your Royal Highness:

I have the honour to submit to Your Royal Highness a report of the Department of Agriculture for the fiscal year ending March 31, 1915.

I. GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Royal Highness under their respective headings.

The legislation affecting the department during this period consisted of:—

Chapter 7, 4-5 George V, intituled "An Act to regulate the Manufacture and Sale of Dairy Products and to prohibit the Manufacture or Sale of Butter Substitutes." (Assented to May 27, 1914.)

Chapter 22, 4-5 George V, intituled "An Act to regulate Cold Storage Warehouses." (Assented to June 12, 1914.)

The Right Honourable the Secretary of State for the Colonies forwarded under a circular letter, dated the 10th November, 1914, an order issued by the Board of Agriculture and Fisheries, relative to the importation of dogs into Great Britain from abroad. This order will be found as an appendix hereto. (See appendix No. 19.)

By an Order in Council of date the 17th day of April, 1914, the regulations under "The Meat and Canned Foods Act," established by Order in Council of the 1st of August, 1910, and amended by Order in Council of the 12th of November, 1910, were further amended by expunging the following part of section 12 thereof relating to tapeworm cysts:—

> "Tapeworm Cysts: *Cysticercus bovis, Cysticercus cellulosæ*, except when the infestation is slight, in which case the carcass may be rejected and rendered into lard or tallow,"

and substituting therefor the following:—

> "Tapeworm Cysts: *Cysticercus cellulosæ*, except when the infestation is slight, in which case the carcass may be rejected and rendered into lard.

Cysticercus bovis, except when the infestation is slight, in which case the carcass may be rejected and rendered into tallow.

"In carcasses where the infestation is slight, and confined to the head and heart, the carcass, after the removal and condemnation of the affected parts, if properly identified by 'Held' tags, and kept in cold storage or pickle for twenty-one days, may upon re-inspection, if found otherwise fit for food, be passed and marked as required by the regulations.

"*Cysticercus ovis*, except when the infestation is slight, in which case the carcass may be rejected and rendered into tallow.

"In carcasses where the infestation is slight and confined to the head and heart, the carcass, after the removal and condemnation of the affected parts, if properly identified by 'Held' tags, and kept in cold storage or pickle for twenty-one days, may upon re-inspection, if found otherwise fit for food, be passed and marked as required by the regulations."

Vide Canada Gazette, vol. xlvii, p. 3761.

By an Order in Council of date the 18th day of May, 1914, the following regulations relating to tuberculosis were made and established for the purpose of ensuring a pure and wholesome milk supply for the inhabitants of many cities and towns of Canada, and especially to prevent the sale of milk from tuberculous cows:—

REGULATIONS RELATING TO TUBERCULOSIS.

1. The aid of the Department of Agriculture, as aforesaid, will be given to such cities or towns having a population of not less than five thousand persons as shall have secured the necessary provisions under provincial legislative authority for the purpose of agreeing to the present regulations.

2. The Government of Canada will assist any city or town, which shall have signified in writing to the Veterinary Director General its desire to have the aid of the Department of Agriculture in controlling bovine tuberculosis in the cows supplying milk and cream to the said city or town, provided the said city or town shall have stated in its application for the aid of the Department of Agriculture, as aforesaid, that, being thereunto duly empowered by law, it will undertake and provide that:—

(*a*) Dairies in which milk or cream are produced for sale therein shall be licensed.

(*b*) No license shall be issued unless the dairy conforms to the required standard.

(*c*) The standard shall require that the stable shall have an ample amount of air space, and at least two square feet of window glass for each cow, and shall be well ventilated, drained, and kept clean and sanitary.

(*d*) After two years from the date of the first test of the cattle of any dairy, the sale within the said town or city, of milk or cream from any herd shall be prohibited unless the said herd shows a clean bill of health from the Veterinary Inspector.

(*e*) An inspector or inspectors shall be appointed and paid by the said city or town, whose duty it shall be to see that the undertakings and provisions, as aforesaid, are carried out, and that the cows are kept clean and properly fed and cared for.

The Veterinary Director General on receiving notice in writing, from any such municipality of its desire to have the assistance of the Department of Agriculture, as aforesaid, shall forthwith make inquiry, and if satisfied that the foregoing requirements are being carried out shall send Veterinary Inspectors to inspect the said cows.

4. Veterinary inspectors shall use the tuberculin test and also make a careful physical examination of the cows, in order to determine whether they are healthy or not. Dairy bulls shall also be examined and subsequently treated in the same way as cows.

5. Following the examination and test the diseased cows and reactors shall be dealt with as follows:—

(*a*) Cows which in the opinion of the inspector are affected with open tuberculosis and are distributing the germs of the disease through the milk, fæces or sputum, shall be sent to an abattoir under inspection and there slaughtered as soon as conveniently can be done. When no such abattoir is within reasonable distance, the cows shall be slaughtered in the presence of the inspector, who shall direct how the carcass shall be disposed of.

(*b*) Reactors to the test shall be separated from non-reactors as effectively as possible (suspicious animals shall be classed as reactors), and the owner shall be given the choice of disposing of them in one of the following ways:—

(1) Immediate slaughter.

(2) Slaughter after they have been prepared for the block, by drying off and feeding.

(3) Retaining them in the herd, and selling no milk or cream until it has been pasteurized.

6. Compensation shall be paid to the owner of the herd for all cows slaughtered under these regulations upon the following basis:—

(1) One-half the appraised value of the cow if destroyed as a case of open tuberculosis.

(2) One-third the appraised value of the cow if destroyed as a reactor at the request of the owner.

(3) Valuation shall be made by the inspector, and shall not exceed the maximum valuation for cattle as specified in section 6 of the Act.

7. The salvage from the carcass shall be paid to the owner of the cow in addition to the compensation, provided compensation and salvage together amount to less than the appraised value; if more, the surplus shall be paid to the Receiver General.

8. No compensation shall be paid to the owner unless, in the opinion of the minister, he assists as far as possible in the eradication of the disease by following the instructions of the inspector as to disinfection, etc.

9. No milk or cream shall be sold from a herd containing reactors unless such milk and cream are properly pasteurized. The inspectors of the municipality shall see that this provision is effectively carried out.

10. Tests and examinations of the herds shall be made whenever deemed necessary by the Veterinary Director General, and after each test and examination the herd shall be dealt with in the manner aforesaid.

11. All cows bought by the owner of a herd while under control, shall be submitted to the test and successfully pass it before being placed with the healthy cows.

12. When two successive tests fail to detect any reactors in a herd it shall be deemed healthy, and the veterinary inspector shall, when requested, give a certificate to that effect.

13. The existing regulations respecting tuberculosis, in so far as they may be inconsistent with the present regulations, are hereby repealed.

Vide Canada Gazette, vol. xlvii, p. 4447.

By an Order in Council of date the 6th day of June, 1914, the following regulations under "The Dairy Industry Act, 1914," were made and established:—

DEFINITIONS.

1. In these regulations, unless the context otherwise requires:—

(*a*) "Act" means "The Dairy Industry Act, 1914;"

(*b*) "Minister" means the Minister of Agriculture;

(*c*) "brand" means any mark, stencil, stamp, label, or writing placed on cheese, or on any package containing cheese, butter, or other dairy product, for the purpose of designating a particular grade or classification, the place of manufacture or the country of origin;

(*d*) "butter" means the food product commonly known as butter, which is manufactured exclusively from milk or cream or both, with or without the addition of colouring matter, common salt, or other harmless preservatives;

(*e*) "creamery" means a place where the milk or cream of not less than fifty cows is manufactured into butter;

(f) "creamery butter" means butter which is manufactured in a creamery;

(*g*) "dairy" means a place where the milk or cream of less than fifty cows is manufactured into butter;

(*h*) "dairy butter" means butter which is manufactured in a dairy;

(*i*) "dairy product" or "dairy products" means any milk, cream, condensed milk, milk powder, butter, or cheese, or any other article manufactured from milk, and all imitations thereof;

(*j*) "package" means any box, tub, crock, tin, crate, case, paper wrapper, or any other receptacle or covering used for the packing of butter;

(*k*) "whey butter" means butter which is manufactured from whey.

COMPULSORY BRANDING.

2. All brands placed on cheese or on packages containing cheese or butter, as required by these regulations, shall be legible and indelible, and shall consist of letters not less than one-half an inch long and three-eights of an inch wide, except in the case of parchment paper wrappers for butter, the branding of which shall be in letters not less than one-quarter of an inch square.

3. Every manufacturer of whey butter shall cause the package containing such whey butter to be branded with the words "whey butter" at the time of packing.

4. Every person who mixes whey butter with creamery butter or with dairy butter, shall cause the packages containing such mixed butter to be branded at the time of packing with the words "whey butter."

5. Every person who mixes dairy butter with creamery butter shall cause the packages containing such mixed butter to be branded, at the time of packing, with the words "dairy butter."

6. Every person who manufactures butter from a mixture of ordinary cream as separated from milk, and cream which has been separated from whey, shall cause the package containing such butter to be branded, at the time of packing, with the words "whey butter."

7. Every person who packs dairy butter in boxes similar to those used for the packing of creamery butter, shall cause such packages to be branded, at the time of packing, with the words "dairy butter."

8. No person shall cut or pack dairy butter into blocks, squares, or prints and wrap such blocks, squares or prints in parchment paper unless the said parchment paper is printed or branded with the words "dairy butter."

9. Every cheesemaker who manufactures cheese from or by the use of milk, commonly known as skim-milk, or milk from which any cream has been removed,

or milk to which skim-milk has been added, shall brand on the side of every cheese, within twenty-four hours after the cheese is removed from the press, or before it leaves the factory, the words "skim-milk cheese," and also upon the outside of every box or package which contains cheese, the words "skim-milk cheese" at the time the cheese is boxed or packed.

10. When butter is packed in tubs or boxes, all brands required by these regulations shall be applied on the side of the package.

PROHIBITED BRANDING.

11. No person shall brand any package containing butter with the words "creamery butter" or with any combination of the word creamery unless such butter is creamery butter within the meaning of the Act and these regulations.

12. No person shall apply any brand of the word "Canadian," "Canadien" or "Canada" as a descriptive term, mark or brand, upon any cheese or upon any box or package which contains cheese or butter, unless such cheese or butter has been produced in Canada.

13. No person shall brand any cheese, or brand any package containing cheese or butter in any manner that shall give false information as to the country of origin, or as to the cheese factory or creamery in which it was manufactured.

THE SALE OF DAIRY PRODUCTS.

14. No person shall knowingly sell, offer, expose, or have in his possession for sale:—

(*a*) Any whey butter unless the package containing such whey butter is branded with the words "whey butter;"

(*b*) Any butter which consists of a mixture of whey butter and creamery butter or whey butter and dairy butter unless such mixture of butter is branded "whey butter;"

(*c*) Any mixture of dairy butter and creamery butter unless such mixture is branded "dairy butter;"

(*d*) Any butter manufactured from a mixture of ordinary cream as separated from milk, and cream which has been separated from whey unless such butter is branded with the words "whey butter;"

(*e*) Any dairy butter packed in boxes similar to those used for the packing of creamery butter unless such packages are branded "dairy butter;"

(*f*) Any dairy butter packed, moulded, or cut into blocks, squares or prints, and wrapped in parchment paper unless such parchment paper is branded "dairy butter;"

(*g*) Any cheese manufactured from or by the use of milk commonly known as skimmed milk, or milk from which cream has been removed, or milk to which skimmed milk has been added, unless the words "skim-milk cheese" are branded upon the side of every cheese and also upon the outside of every box or package which contains cheese;

(*h*) Any butter branded as creamery butter or any combination of words which includes the word creamery unless such butter is creamery butter according to the definition in the Act, and in these regulations;

(*i*) Any cheese upon which the word "Canadian," "Canadien," or "Canada" is branded, or any cheese or butter contained in any package upon which the word "Canadian," "Canadien," or "Canada" is branded as a descriptive term, unless such cheese or butter has been produced in Canada;

(*j*) Any cheese which is branded or any cheese or butter which is con-

tained in a package which is branded in such a manner as to give false information as to country of origin, or as to the cheese factory or creamery in which it was manufactured.

15. No person, except the final purchaser or consumer, shall remove, obliterate or erase or cause to be removed, obliterated, or erased, any brand placed upon any cheese, or upon any package containing cheese or butter as required by these regulations.

16. Any person who violates any regulation made under the authority of the Act shall for each offence, on summary conviction, be liable to a fine of not less than ten dollars nor more than thirty dollars.

17. Any pecuniary penalty imposed under these regulations shall, when recovered, be payable, one-half to the informant or complainant and one-half to His Majesty.

18. These regulations shall come into force on the first day of September, 1914.

Vide Canada Gazette, vol. xlvii, p. 4354.

By an Order in Council of date the 20th day of June, 1914, the regulations under "The Cold Storage Act," established by Order in Council of the 11th March, 1910, were amended by adding thereto the following sections:—

"9. Owners or managers of cold storage warehouses with whom contracts have been entered into for the payment of subsidies under the Cold Storage Act;

"(*a*) Shall give the public the preference in the use of the refrigerated space in such warehouses. It shall be deemed to be a violation of the regulations if the owner of the warehouse refuses to receive goods from the public at the approved rate for storage on the ground of lack of space, when any part of the space is occupied by goods which are the property of the owners of the warehouse;

"(*b*) Shall not contract or agree to give all the refrigerated space to one or more firms to the exclusion of the general public;

"10. Owners or managers of cold storage warehouses with whom contracts have been entered into the payment of subsidies under the Cold Storage Act and who receive fish for storage shall accept herring at the usual rate and if delivered in the usual manner, irrespective as to whether said herring are to be used for food or for bait;

"11. Every person who violates any of the above said regulations shall for every such offence incur a penalty not exceeding fifty dollars."

Vide Canada Gazette, vol. xlvii, p. 5.

By an Order in Council of date the 2nd day of October, 1914, under and in virtue of the authority conferred by the "War Measures Act, 1914," the Governor General in Council was pleased to order that the following orders and regulations respecting patents of invention be made and established:—

1. "Commissioner" means the Commissioner of Patents and includes the Deputy Commissioner of Patents.

2. The commissioner may, on the application of any person, and subject to such terms and conditions, if any, as he may think fit, order the avoidance or suspension, in whole or in part, of any patent or license, the person entitled to the benefit of which is the subject of any State at war with His Majesty, and the Commissioner, before granting any such application, may require to be satisfied on the following heads:—

(*a*) That the person entitled to the benefit of such patent or license is the subject of a State at war with His Majesty;

(*b*) That the person applying intends to manufacture or cause to be manufactured, the patented article, or to carry on, or cause to be carried on, the patented process within the Dominion of Canada;

(*c*) That it is in the general interests of the country, or of a section of the community, or of a trade, that such article should be manufactured or such process carried on as aforesaid.

The fee payable on such application shall be ten dollars.

The commissioner may at any time, in his absolute discretion, revoke any avoidance or suspension of any patent or license ordered by him.

Provided always that the commissioner may at any time, if in his absolute discretion he deems it expedient in the public interest, order the avoidance or suspension in whole or in part of any such patent or license upon such terms and conditions, if any, as he may think fit.

3. In any case in which the commissioner makes an order by virtue of the powers vested in him under these rules and regulations or any of them, avoiding or suspending in whole or in part a patent, he may, in his discretion, grant in favour of persons other than the subject of any State at war with His Majesty, license to make, use, exercise or vend the patented invention so avoided or suspended, upon such terms and conditions and either for the whole term of the patent or for such less period as the Commissioner may think fit.

4. The commissioner may, at any time during the continuance of these orders and regulations, avoid or suspend any proceedings on any application made under the Patent Act by a subject of any State at war with His Majesty.

5. The commissioner may also, at any time, during the continuance of these orders and regulations, extend the time prescribed by the Patent Act or any rules made thereunder, for doing any act or filing any document, upon such terms and subject to such conditions as he may think fit in the following cases, namely:—

(*a*) Where it is shown to his satisfaction that the applicant, patentee, or proprietor, as the case may be, was prevented from doing the said act, or filing the said document, by reason of active service or enforced absence from this country, or any other circumstances arising from the present state of war, which, in the opinion of the commissioner, would justify such extension;

(*b*) Where the doing of any act would, by reason of the circumstances arising from the present state of war, be prejudicial or injurious to the rights or interests of any applicant, patentee or proprietor as aforesaid.

Such extension of any prescribed time, if granted after its expiration, shall have the same effect as if granted prior thereto, provided such expiration occurred on or after the fourth day of August, 1914.

6. The commissioner may refuse to register the assignment of any patent made by a subject of any State at war with His Majesty and filed in the Patent Office on or after the fourth day of August, 1914, unless satisfied that such assignment was made in good faith and not for the purpose of evading any of the provisions of the foregoing orders and regulations.

7. The term "person" used in these orders and regulations shall, in addition to the meaning given thereto by par. 20 of section 34 of "The Interpretation Act," include any government department.

8. These orders and regulations shall come into operation as and from the fourth day of August, 1914.

9. The orders and regulations respecting Patents of Invention made under "The War Measures Act, 1914," and dated the 11th September, 1914, are hereby rescinded and repealed.

Vide Extra Canada Gazette, October 5, 1914.

By an Order in Council of date the 24th day of November, 1914, the regulations under the "Destructive Insect and Pest Act" respecting destructive insects, pests, and plant diseases, established by Order in Council of the 4th November, 1914, were amended as follows:—

No. IV, 1. First line, eighth word "State" to read "States;"
First line, after tenth word, add the words "and New York;"

N. IV., 1. *(a)* First line, ninth word "State" to read "States";
First line, after eleventh word, add the words "and New York;"
First line, delete last word "one," and insert instead "two;"
Second line, eleventh word "State" to read "States;"

No. IV, 1. (*b*) First line, last word "State" to read "States;"
Second line, after second word add "and New York;"

No. IV, 1. (*c*) First line, seventh and eighth words "this State" to read "these States;"

No. IV, 1. (*d*) First line, eighth word "State" read "States;"
First line, after tenth word add "and New York."

Vide Canada Gazette, vol. xlviii, p. 1893.

By Order in Council of date the 6th January, 1915, His Royal Highness the Governor General was pleased to exercise the powers granted by the Royal Proclamation published in *The Canada Gazette* of date the 15th October, 1914, for the purpose of granting licenses for the Dominion of Canada similar to that granted by the British Board of Trade under date the 4th November, 1914, and published in *The London Gazette* of the 6th November, 1914, as follows:—

"To pay any fees necessary for obtaining the grant or for obtaining the renewal of patents or for obtaining the registration of designs or trade marks or the renewal of such registration in an "enemy country;" and

"Also to pay on behalf of an "enemy" any fees payable in the United Kingdom on application for or renewal of the grant of a patent or on application for the registration of designs or trade marks or the renewal of such registration."

By an Order in Council of date the 11th of January, 1915, the regulations under "The Destructive Insects and Pest Act," established by Order in Council of the 4th November, 1914, were amended by inserting after the word "removed" in the third line of the Plant Disease Regulations IV, section 2, definition "table potatoes," the following words:—

"And which are of good quality, sound, and otherwise fit for human consumption."

Vide Canada Gazette, vol. xlviii, p. 2201.

By an Order in Council of date the 8th day of February, 1915, in pursuance of the provisions of an Order in Council of date the 6th day of January, 1915, respecting the granting of licenses in connection with the Royal Proclamations relating to Trading with the Enemy, published in *The Canada Gazette* on the 12th day of Sep-

tember, 1914, and the 15th day of October, 1914, His Royal Highness the Governor General in Council gave and granted licenses to all persons resident carrying on business or being in the Dominion of Canada:—

To pay any fees necessary for obtaining the grant or for obtaining the renewal of patents or for obtaining the registration of designs or trade marks or the renewal of such registration in an "enemy country;"

An also to pay on behalf of an "enemy" any fees payable in the Dominion of Canada on application for or renewal of the grant of a patent or on application for the registration of designs or trade marks or the renewal of such registration.

The expression "enemy country" herein means the territories of the German Empire and of the Dual Monarchy of Austria-Hungary, together with all the Colonies and Dependencies thereof, as well as the Dominions of His Imperial Majesty the Sultan of Turkey other than any territory in the occupation of His Britannic Majesty or His Allies.

The expression "enemy" herein means any person or body of persons of whatever nationality resident or carrying on business in the enemy country, but does not include persons of enemy nationality who are neither resident nor carrying on business in the enemy country. In the case of incorporated bodies, enemy character attaches only to those incorporated in an enemy country.

By an Order in Council of date the 27th day of March, 1915, the regulations under "The Animal Contagious Diseases Act," established by Order in Council of the 30th November, 1909, and amendments thereto, were further amended by rescinding section 88½ and substituting the following section in lieu thereof:—

"88½. The importation, manufacture, sale or use of hog cholera serum or virus, except by an inspector acting under the special authority of the Veterinary Director General, is prohibited."

Vide Canada Gazette, vol. xlviii, p. 3096.

A report from the Canadian Exhibition Commissioner for the fiscal year ended March 31, 1915, will be found as an appendix hereto. (See appendix No. 18.)

The Canadian Exhibition Commissioner and staff have been busily engaged in the preparation of a Canadian display of the natural resources of the Dominion for exhibit at the Panama-Pacific International Exposition now being held at San Francisco, and I am pleased to say that the Canadian exhibit was the only one completed for the opening day, February 20, 1915.

I had the pleasure of going to assist in the dedication of the Canadian building, and had the advantage of seeing what they were doing.

I may say, without hesitation, that not only has Canada the best exhibit it ever had at any exhibition, but it is quite evident we have made the centre of attraction of the whole exhibition among the nations. We have the best exhibit and the best building, I think, of the whole exhibition.

Canada participated in the Sixth International Dairy Congress, held in Berne, Switzerland, in June, 1914, and was represented thereat by Mr. J. A. Ruddick, the Dairy and Cold Storage Commissioner.

Canada participated in the Tenth International Veterinary Congress, held in London, England, in August, 1914, and was represented thereat by Dr. F. Torrance, the Veterinary Director General.

II. ARTS AND AGRICULTURE.

DAIRY AND COLD STORAGE BRANCH.

The appointment of a fruit commissioner on May 1, 1914, relieved the Dairy and Cold Storage Commissioner of the responsibility for the work of the Fruit Division, and confined the operations of the branch under his charge to dairying, extension of markets, and cold storage.

The following is a summary of the main activities of the Dairy and Cold Storage Branch during the year under review:—

I. Dairying.

COW TESTING.

Farmers have been encouraged and assisted to keep records of the quantity of milk produced by each cow for the purpose of distinguishing the profitable ones from those that are unprofitable. Record forms are sent, free of charge, to all who apply for them.

DAIRY RECORD CENTRES.

Additional Dairy Record Centres have been organized, with an expert in charge of each, who gives his whole time to a limited district and endeavours to get all the farmers in his territory to weigh each cow's milk and to take samples for testing at regular intervals.

Once a year a complete census of all the herds in the district is taken, with full particulars as to breeding, feeding, and means to improve the average production.

There were thirty-five of these Dairy Record Centres in operation in 1914.

The propaganda in connection with the cow testing movement consists of:—

(*a*) The publication of popular bulletins and circulars on the subject;

(*b*) The frequent preparation of short articles for the press dealing with various aspects of the work and citing specific cases of increase in milk yield as a result of systematic testing;

(*c*) Addresses given by the recorders, provincial supervisors, and members of the headquarters staff;

(*d*) Personal visits to farmers by recorders; and

(*e*) A very extensive correspondence.

The average production of milk in Canada has been increased by 1,000 pounds per cow since this work was started. With over two and a half million cows in Canada the value of the total annual production is thus increased by at least $25,000,000, and the work is only just begun.

A MODEL CHEESE FACTORY.

A model cheese factory and creamery is operated at Finch, Ont., on a regular commercial basis. This establishment is conducted for the purpose of:—

(*a*) Demonstrating the advantages of certain improvements in the construction of cheese factory and creamery buildings;

(*b*) To determine the value of new apparatus and machinery and also new methods and practices in the manufacture of cheese and butter;

(*c*) To encourage the production of winter milk; and

(*d*) To encourage proper business methods in the management of factories.

A MODEL CREAMERY.

A model creamery is operated at Brome, Que., for the same purposes and with the same objects in view as in the case of the factory at Finch.

EXPERIMENTAL AND DEMONSTRATION WORK.

Investigations and experiments relating to dairy manufacturers, and the handling of milk, are conducted from time to time as occasion arises.

New processes are demonstrated and illustrated in order to bring them to the attention of those interested.

Lantern slides are used as far as possible in lecture and demonstration work.

II. Creamery and Farm Cold Storages.

A bonus of $100 is paid to any creamery that erects suitable cold storage rooms according to plans and specifications furnished free by the department.

Working plans and specifications for small cold storages and dairies suitable for the use of farmers, hotels, and country merchants are also distributed free to all who apply for them.

III. Refrigerator Car Services.

FOR BUTTER.

An arrangement is in force with the railway companies in Ontario, Quebec, and Nova Scotia, for a refrigerator car service for butter, covering the period from the middle of May to the middle of October. These cars are run weekly or fortnightly, according to the requirements of the route, on an advertised schedule, so that shippers can deliver their butter to the station with the least possible exposure to heat. A shipper may forward any quantity from one package upwards, and pay only the regular less-than-carload rate, without extra charge for icing. The department guarantees, on each car, two-thirds of the earnings of a minimum carload from starting point to destination, plus about two-thirds of the cost of icing. Inspectors are engaged at freight terminals to watch the unloading of these cars, to report on their condition and on the temperature of the butter and the quantity of ice remaining in the bunkers. The reports are sent daily to headquarters at Ottawa, and any defects or deficiencies in the service are brought to the attention of the responsible railway authorities. In this way an efficient service is maintained.

FOR CHEESE.

Commencing about the middle of June and extending for a period of eleven weeks, the department pays the icing charges, up to $5 per car, on a limited number of refrigerator cars, when used for carload shipments of cheese from one station.

FOR FRUIT.

A similar arrangement, except that there is no limit to the number of cars, is in force from the first of August to the first of October, for shipments of early apples and tender fruits, in carloads, consigned to Montreal and Quebec for export in cold storage.

IV. Reserved Chambers for Fruit.

Exporters of early apples and other tender fruits who wished to ship in cold storage from Montreal to the United Kingdom frequently found it difficult to do so, because the quantity they had to offer was so small that it was not worth while for a shipping company to operate a whole chamber to handle it exclusively, it not being permissible to carry other produce with fruit. To overcome this difficulty, the department through this Branch has, for a number of years past, arranged with the steamship lines to different ports to have one chamber reserved for fruit on certain steamers sailing during the months of August, September, and part of October, the department guaranteeing a revenue equal to the earnings of one-half of the chamber. Of late years the chamber has nearly always been well filled.

V. Cargo Inspection.

Cargo inspectors are stationed at Montreal, Quebec, Halifax, Liverpool, Bristol, London, and Glasgow to report on the condition in which perishable goods are delivered to and discharged from the steamships, and to supervise the handling generally. A large number of self-recording thermometers, or thermographs, are used in this service, and the records of temperature thus obtained are available for interested shippers of fruit, cheese, meats, etc. A Canadian shipper may, by application to the Dairy and Cold Storage Commissioner, secure complete records of any consignment from the time the goods arrive at the loading port in Canada until they are distributed in the United Kingdom. This applies also, but not so generally, to shipments for South Africa and Australasia.

VI. A Pre-cooling and Fruit Storage Warehouse.

The experimental cold storage warehouse which has been erected at Grimsby, Ont., under the direction of the Dairy and Cold Storage Commissioner, is now in full working order.

The fruit growers in this district are pretty generally convinced that in order to get the best results in catering to the Northwest or Old Country markets, or even for long distance shipment in Eastern Canada, it is absolutely necessary that tender fruit should be thoroughly cooled before shipment, and it only remains to demonstrate a satisfactory method that may be generally adopted with that end in view. Several schemes were proposed and discussed, including one for a large central car-cooling plant to serve the whole district, but after due consideration the plan of having a relatively small cold storage warehouse at each important shipping point seemed to give the greatest promise of successfully meeting the needs of the situation.

The growers of any particular locality naturally hesitate before making an investment which is more or less of an experiment, and as the results when worked out at

Grimsby will be of value to the whole district and to other districts as well, the undertaking seems to be a fitting object of governmental initiative.

The control and operation of this cold storage warehouse by the department is serving (*a*) to demonstrate the advantages of the pre-cooling of fruit, and (*b*) to determine the practicability of pre-cooling in a warehouse rather than the cars after loading.

Being fully equipped with every device for the purpose, it will afford excellent facilities for experimental investigations and the scientific study of the problems connected with the storage and transportation of fruit, as well as those which relate to general cold storage work.

Incidentally the shippers of the Grimsby district will be able to use the warehouse for commercial pre-cooling and storage, on payment of the usual rates for such services.

VII. The Enforcement of Laws.

The Dairy and Cold Storage Commissioner is charged with the routine administration of the Cold Storage Act, 1907; the Dairy Industry Act, 1914; and the Cold Storage Warehouse Act, 1914.

DAIRY LAWS.

The leading features of the Dairy Industry Act of 1914 are the sections which prohibit the importation, manufacture or sale of:—

(*a*) butter substitutes of any kind;
(*b*) renovated or process butter;
(*c*) butter containing over 16 per cent of water, and
(*d*) cheese adulterated with fats other than the fat of milk.

The regulations under the Dairy Industry Act provide for the marking of dairy products in such a manner as to protect the honest trader and the consumer from misrepresentation and fraud.

COLD STORAGE LAWS.

The Cold Storage Act (chapter 6, 6-7 Edward VII), of which the details of administration are also in the hands of the Dairy and Cold Storage Commissioner, is intended chiefly to encourage the erection of small local public storage warehouses for the preservation of perishable food products. It provides that the Government may grant a sum not exceeding 30 per cent of the total cost of site, equipment, and construction of such public cold storage warehouses. The subsidy is paid in instalments which are spread over a period of four years. No assistance is given to any company proposing to build in places where a public cold storage is already in existence. The rates charged in subsidized warehouses are subject to the approval of the Governor in Council.

The Cold Storage Warehouse Act of 1914, gives the Governor in Council power to make regulations respecting the operation and control of cold storage warehouses, and the articles of food stored therein.

VIII. Publications and Instructions.

An annual report is published showing in detail the work of the branch. Bulletins and circulars on various subjects are issued from time to time for free distribution.

Members of the staff address a large number of farmers' meetings throughout the year, officiate as judges at dairy exhibitions and at milking competitions and, through an extensive correspondence, act in an advisory capacity on a great variety of subjects.

IX. War Office Supplies.

On October 1, 1914, when the department assumed control of the purchase and shipment of hay and oats for the War Office to be used by the army in France, Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner, was instructed to take charge. The shipments to date total 64,026 gross tons of oats, and 51,811 gross tons of hay. The hay is all re-compressed into comparatively small compact bales, and the oats are all put up in 80-pound sacks. The supervision of this work has naturally demanded a large share of the commissioner's time, as well as that of his assistants, Messrs. W. W. Moore and J. N. Lemieux.

SEED COMMISSIONER'S BRANCH.

The work of this branch may be classified into three general divisions: seed growing, seed testing, and seed inspection. Under seed growing is included educational, investigation, and other work directed toward encouraging the production and use of better seed. Seed testing involves the analysis of samples which are sent to the laboratories at Ottawa and Calgary by seed merchants and farmers, as well as many other tests in connection with departmental investigations. The regular work of seed inspection for the enforcement of the Seed Control Act consists in visiting seed merchants and farmers who have seed for sale to give information in respect to the Act and to see that its provisions are being observed.

SEED GROWING.

The general policy respecting the various phases of seed growing work outlined in previous reports has been continued during the past year, and some new lines of investigation and educational work has been taken up.

Financial assistance toward conducting field-crop competitions, seed fairs, and provincial seed exhibitions has been continued, and with very gratifying results. The Provincial Departments of Agriculture report continued increase in the usefulness of these organizations. The number being conducted by the local agricultural societies has grown rapidly, and much has been done to stimulate more interest in better seed as a means toward increased production. On the present basis, nearly $50,000 is available to the provinces for subvention. The statements have not all been received for last year, but from those to hand it is evident that there has been a substantial increase in the money paid out for prizes compared with the year previous, and a much larger proportion of the subvention available will be claimed.

The subventions offered for growing field root and garden vegetable seeds in Canada are being continued. Last fall special efforts were made to induce more

farmers to select roots with the object of producing their own seed supply as a safeguard against a possible shortage because of the war in countries where most of our supplies are ordinarily obtained.

Several lines of investigational work have been carried on, details of which may be found in the report of the Seed Commissioner for the year ending August 31, 1914, and special bulletins.

Timothy seed production in Western Canada has been given special attention, and it is believed that information has been secured which will be of assistance in placing this branch of farming on a better basis.

An inquiry in regard to the quality of the wheat, oats, barley, flax, and ensilage corn being used for seed in Canada has been completed, and the results reveal a condition not highly creditable to Canadian agriculture. It is apparent that the importance of good seed in relation to grain production is not generally appreciated. On the contrary, the value of Canada's grain crops is enormously reduced each year through lack of attention to proper selection and preparation of seed. Much educational work is needed to impress the importance of more attention to seed selection and to give information in regard to the equipment required for fanning mills and methods of handling them.

From information gathered in connection with the special inquiry referred to, and the field work and seed laboratory tests, it is evident that there is great need for a more abundant supply of seed corn of strong vitality and of a variety and strain suitable for the conditions under which it is to be grown. Numerous partial or total crop failures with ensilage corn have come through using seed that will not grow, and in many instances poor crops in both yield and quality have resulted from using late varieties and strains which do not mature sufficiently to make good ensilage. With the object of improving the seed supply in southwestern Ontario, assistance has been given toward securing information in regard to methods of storing and drying seed corn, and financial assistance has been offered to farmers' clubs for erecting corn-drying houses. Special inspection work has been done to determine the germination qualities of the seed corn available in southwestern Ontario, and, in co-operation with officers of the Provincial Department of Agriculture, assistance has been given in conducting variety tests to ascertain which varieties are most suitable for various districts.

The accumulation and disposition of screenings at the terminal elevators, including the various uses to which they are put, their feeding value and the danger of weed dissemination in feeding them to stock, have been given special attention during the past season. Fairly complete information has been secured, except in respect to the feeding value of different kinds of screenings. Extensive experiments with different kinds of stocks are being conducted in co-operation with the Experimental Farms Branch and the Animal Industry Department of Macdonald College, Quebec, in order to get information on this point.

In the spring of 1914 an investigation was commenced to determine the prevalence of weed seeds in farm lands, and to discover, if possible, the relation of their prevalence to different cultural practices. The work last year was largely of a preliminary nature, although some very suggestive results were secured. There is already suffi-

cient evidence to indicate that weed seeds are present in enormous numbers in ordinary farm lands, and that many of them will retain their vitality for a long time under ordinary systems of cultivation. The investigation will be continued for several years, and it is hoped that information will be obtained which will be suggestive of better weed control.

Considerable general educational work has been done in co-operation with the Provincial Departments of Agriculture and local agricultural organizations. Assistance has been given in conducting seed judging classes at short courses, and educational exhibits have been prepared for some of the leading exhibitions. In order to stimulate the demand for cleaning equipment, and to furnish means whereby information might be obtained in regard to the sieves required for cleaning and grading different kinds of seed, sets of thirty-four hand sieves have been distributed free to the Ontario Department of Agriculture district representatives and the Macdonald College demonstrators in Quebec. These screens are used for short-course work and are at the disposal of farmers to find out which sieves are needed for their purpose.

The policy of distributing weed and economic seeds has been continued, and a special free distribution to schools has been made. The collections contain 100 species of seeds, twenty-five economic plants and seventy-five of weeds. They are sold at $2 per set to seed merchants and agricultural organizations. Last year, 500 lots were prepared and distributed to schools where agriculture forms a part of the instruction. The distribution was made to schools recommended by the Provincial Departments of Education.

Financial assistance to the Canadian Seed Growers' Association has been continued, and the annual report of the association has been printed by this branch for general distribution. Owing to the increase in the regular seed inspection work required by officers of this branch, it has been necessary to discontinue the inspection of seed grown by members of the association. This work is now being done by officers appointed by the association.

SEED TESTING.

The number of samples tested for seed merchants and farmers at the Ottawa laboratory has been slightly in excess of previous seasons. During the laboratory year ending August 31, 1914, 11,373 samples were received, compared with 11,301 during the previous year. From September 1, 1914, to March 31, 1915, 9,022 samples were received, compared with 8,376 in the same period the previous year. At Calgary, the volume of work required was smaller than for several seasons. During the year ending August 31, 1914, 3,733 samples were received, which is less than one-half the average of the two previous years. Most of the work at Calgary is testing vitality of cereals for farmers, and the decrease in the number received was due to the good conditions under which the grain was harvested in 1913. From September 1, 1914, to March 31, 1915, there was a large increase in the number of samples tested at Calgary compared with the previous season. The number of purity tests of timothy, red clover, alsike, and alfalfa made at Calgary during the past season increased over 50 per cent. The increase in the proportion of samples tested for purity has been a

feature of the Calgary work for several years which is an indication of the greater attention to quality of clover and grass seed being used by both seed merchants and farmers. Many of the samples received at both laboratories are tested for both purity and germination.

About 25 per cent of the trade samples tested at the Ottawa laboratory during the year were received in March. For the two months from the middle of February to the middle of April the number received daily averages over 100, which means that more than one-half of the samples tested during the year were received within two months. The nature of the information required in relation to these samples makes it essential that they be examined and reported upon with the least possible delay. It is the aim of the laboratory to issue reports on all samples the day on which they are received, and reports are seldom delayed more than thirty hours after receipt of the samples. To ensure prompt and accurate reports it is necessary to maintain a fairly large staff of highly trained analysts. Last year for the first time since the laboratory was opened a charge was made for seed testing. Twenty-five cents per test is now charged on all samples in excess of twenty-five received from any one farmer or merchant during one year. The main purpose of this charge is to regulate and restrict the service required to work productive of information of real value to the sender.

SEED INSPECTION.

The inspection of seed offered for sale in connection with the administration of the Seed Control Act has been extended and made more thorough. In the spring of 1914, thirty permanent and temporary inspectors were employed. They visited 1,861 towns, an increase of 30 per cent over the number visited the season previous. Many of these places were inspected several times. The total number of dealers or farmers visited was 5,173, compared with 4,212 the year before. On the whole, there has been a marked improvement in the quality of the seed being offered for sale, especially that handled through wholesale dealers, and fewer violations have been detected and fewer prosecutions necessary. In the spring of 1914 there were 708 violations of the Act detected, a decrease of 131 from the previous year, although there was an increase of 961 in the number of dealers visited. Most of these violations were not of a serious nature, consisting mostly in failure to have grade numbers properly marked. Only thirty-one dealers were prosecuted compared with seventy-five the previous season.

A large proportion of the violations were through seed obtained direct from growers and not properly cleaned and tested before being offered for sale. With a few exceptions the seed supplied by the wholesale dealers has been put on the market in conformity with the Seed Control Act. Several minor violations were detected through failure of the retail dealers to preserve the tags bearing the grade numbers.

The inspection work so far conducted this spring indicates a still further improvement in the trade, and fewer violations are being observed in proportion to the number of dealers visited.

In the fall of 1914 a request was received from the Honourable the Minister of the Interior for co-operation in connection with the purchasing and distribution of seed grain to needy settlers in Saskatchewan and Alberta, and under my instructions

the Seed Branch officers are co-operating with the purchasing commissioners of the Interior Department. Seed which is passed by officers of this branch is accompanied by a certificate of inspection in each bag. This special inspection work has involved a great deal of extra work and has interfered more or less with the regular inspection of the seed trade in the Prairie Provinces.

THE LIVE STOCK BRANCH.

In reviewing the work of the year, it will be of interest to note that, to provide for the increasing work of the branch, there have been added to the staff during that period twelve permanent employees in the Inside and Outside Service, together with a considerable number of temporary officers employed in field work. The present permanent staff, consisting of fifty-five persons, is two and three-quarters times as large as it was four years ago, when twenty persons only were employed.

In a comparison of the expenditures of the year just closed, and of preceding years, a corresponding increase is to be reported. The expenditure for 1911-12 amounted to $94,011.14; that for 1912-13, to $100,821.94, that for 1913-14 to $174,637.96, while that for 1914-15, although the final figures are not yet available, will amount to more than $300,000.

That the activities of the branch have increased very greatly during the past three or four years may be gathered from the data just furnished with respect to the additions to the staff and to the expanding expenditures in the interest of live stock development. As in 1913, perhaps the most significant feature of the year's work has been the administration of the policy respecting the loan of pure-bred male animals. The advantages of this policy have now been brought to the attention of a very large number of farmers throughout all the provinces of the Dominion, and the tables which follow will serve to indicate the extent to which associations of farmers have availed themselves of the benefits to be derived from the use of the pure-bred sires distributed under this scheme.

STALLIONS LOANED TO ASSOCIATIONS OF FARMERS DURING 1914.

Breed.	B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Total.
Clydesdale		17	13	7	3	13	2	4	2	61
Percheron		8	4		1					13
Belgian						1				1
Suffolk Punch		1								1
Thoroughbred						1				1
Hackney						3	1			4
Standard bred								1		1
French Canadian						15				15
Totals		26	17	7	4	33	3	5	2	97

During 1913, five stallions only were distributed. Of these, Ontario received three, all being Clydesdales; Quebec two, of which one was a Percheron and one a Clydesdale.

BULLS LOANED TO ASSOCIATIONS OF FARMERS DURING 1913-14.

Breed.	Maritime.		Que.		Ont.		Man.		Sask.		Alta.		B.C.		Total.	
	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	13'—	'14
Shorthorn	..	14	..	42	9	24	19	21	29	102	19	55	..	4	76	262
Ayrshire	..	15	..	49	..	1	..	..	1	4	..	1	2	1	3	71
Holstein	..	4	..	10	3	4	4	5	3	10	4	2	1	1	15	36
Hereford	..	..	..	1	..	3	3	2	..	5	1	8	..	..	4	19
Angus	..	..	..	..	..	..	1	1	1	4	..	3	..	..	2	8
Jersey	..	4	..	1	..	..	..	..	..	..	..	..	..	..	..	5
Canadian	..	..	..	7	..	..	..	..	..	..	..	..	..	..	..	7
Red Polled	..	..	..	..	..	..	..	1	1	2	..	..	..	..	1	3
Devon	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Galloway	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1
Guernsey	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Total	..	39	..	110	12	32	27	30	35	127	24	70	3	6	101	414

RAMS LOANED TO ASSOCIATIONS OF FARMERS DURING 1913-14.

Breed.	P.E.I.		N.S.		N.B.		Que.		Ont.		Man.		Sask.		Alta.		Total.	
	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14
Shropshire	28	30	19	24	6	16	18	133	2	7	2	..	1	3	6	10	82	223
Oxford Down	..	17	38	58	9	1	5	18	3	4	11	5	..	1	..	1	66	105
Leicester	..	5	..	..	..	1	8	40	16	15	..	1	2	..	..	..	26	62
Cheviot	4	1	4	..	..	..	..	13	..	..	..	1	..	..	..	..	8	15
South Down	4	2	..	3	..	..	3	1	..	1	..	..	..	1	..	..	7	8
Hampshire	..	..	..	..	4	..	3	..	..	..	..	..	..	..	..	..	7	..
Lincoln	..	..	..	..	..	..	3	1	..	..	..	..	..	..	..	1	2	2
Suffolk	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	3	..
Cotswold	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Total	36	55	61	86	19	18	40	206	21	27	16	7	3	5	6	12	202	416

BOARS LOANED TO ASSOCIATIONS OF FARMERS DURING 1913-14.

Breed.	P.E.I.		N.S.		N.B.		Que.		Ont.		Man.		Sask.		Alta.		B.C.		Total.	
	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14	'13—	'14
Yorkshire	..	3	3	5	3	3	23	63	8	5	3	2	13	10	2	6	..	..	55	97
Berkshire	5	..	1	1	..	1	..	1	5	4	8	5	15	23	21	13	3	1	58	49
Poland China	..	..	..	..	..	..	..	2	1	..	4	1	1	12	..	7	..	..	6	22
Duroc Jersey	..	..	..	..	..	..	..	..	..	..	1	..	1	4	8	2	1	..	11	6
Chester White	..	..	3	3	..	1	1	4	3	..	..	..	..	..	..	..	..	..	7	8
Tamworth	..	..	..	..	..	..	..	1	..	..	..	1	..	1	1	..	..	..	1	3
Total	5	3	7	9	3	5	24	71	17	9	16	9	30	50	32	28	4	1	138	185

APPLICATIONS FOR STALLIONS, 1915.

Prince Edward Island	2
Nova Scotia	2
New Brunswick	1
Quebec	39
Ontario	....
Manitoba	5
Saskatchewan	71
Alberta	58
British Columbia	2
Total	180

APPLICATIONS FOR BULLS, 1915.

Breed.	B.C.	Alta.	Sask.	Man.	Ont.	Que.	Maritime.	Total.
Shorthorn	6	67	126	13	21	40	16	289
Ayrshires	3	1	1	....	2	59	25	91
Holstein	6	2	9	2	4	13	5	41
Hereford	....	4	5	4	....	3	1	17
Angus	....	3	4	4	1	....	....	12
Jersey	1	....	....	....	....	1	....	2
Canadian	....	....	....	....	....	2	1	3
Red Polled	....	2	2	1	....	....	....	5
Guernsey	....	....	....	....	....	....	1	1
Galloway	....	1	....	....	....	....	....	1
Total	16	79	148	24	28	118	49	462

Regarding the distribution of stallions, reference should be made to the fact that the applications for the loan of horses, during the current year, have been received particularly from the more recently settled districts of Saskatchewan and Alberta. Some of the associations applying have been formed in districts situated considerably more than one hundred miles north of any railway line. The primary object of the policy is thus being definitely effected, in that pure-bred sires of good type and quality are being rendered available to sections of the country where otherwise scrub stock of indiscriminate breeding could alone be secured.

The stallions purchased have thus far proven reasonably satisfactory, and with very few instances, the associations have commented favourably upon the excellence of the individuals with which they have been supplied. Eighty per cent of the associations to which horses were loaned in 1913 have forwarded to the department renewal applications for the current year.

The task of securing such a large number of bulls as were required in 1914 was admittedly a difficult one, by reason of the active demand for breeding stock of certain breeds which existed in the spring of 1914. In fact, owing to the scarcity of bulls, it was necessary to hold over until 1915 many applications which were received late in the season.

It is but natural to expect that, as a result of the introduction of bulls of superior breeding into sections hitherto obliged to use scrub sires of nondescript type, a marked improvement in the herds of the country will be found. Reports received from associations which were supplied with bulls in 1913 indicate that the benefits are

becoming apparent, and that the efforts of the department are appreciated. Further evidence of the popularity of the policy is afforded by the fact that the number of applications from new associations, received for the season of 1915, considerably exceeds the number dealt with in 1914. It is also gratifying to know that in the western provinces, and particularly in Saskatchewan, the desire to increase the number and size of the herds and to improve the quality has evidently not suffered a relapse as a result of the impetus given to grain production by the outbreak of the war.

For the information of those who are not yet fully acquainted with the policy, a statement of the general rules governing distribution follows:—

GENERAL RULES GOVERNING DISTRIBUTION.

1. All animals placed remain the property of the Department of Agriculture and are subject to the general control and supervision of the Live Stock Commissioner.

2. The Live Stock Commissioner reserves the right to inspect an animal at any time and to withdraw it from the hands of an association in the event of it being found in unsatisfactory condition or should he consider that the management of the affairs of an association is not in accord with the intention of the department.

3. The wishes of an association, as expressed at a regularly called meeting shall, subject to the approval of the Live Stock Commissioner, determine the breed from which the sire placed shall be selected. It shall be understood, however, that in the case of all classes of stock, any sire which may subsequently replace the one originally placed shall be of the breed primarily chosen by the association.

4. Breeding privileges shall be restricted to members of the association.

5. The Live Stock Commissioner reserves the right to determine the maximum number of females to be bred to any individual sire placed with an association. In no case shall the maximum allowed exceed the following:

Stallions—3 years old, 50 mares; 4 years old, 75 mares; 5 years old and over, 100 mares.

Bulls—Yearling, 35 cows; 2 years old, 60 cows; 3 years old and over, 90 cows.

Rams—Lambs, 40 ewes; yearling or over, 50 ewes.

Boars—50 sows.

The above figures are subject to reduction in the case of certain individual animals and in the case of districts in which the breeding will be confined to a short season.

6. All grade male progeny of association sires must be castrated before they reach the ages indicated as follows:—

Colts, 15 months.

Calves, 6 months.

Lambs, 1 month.

Pigs, 6 weeks.

7. The Board of Directors shall, subject to the approval of the Live Stock Commissioner, select the man or men in whose charge the sires will be kept. In no instance, save in the case of rams, shall the secretary of an association act as caretaker of an animal loaned to the association by the department.

8. Each party so chosen shall sign in triplicate, an agreement with the directors. The necessary blank forms will be supplied by the branch.

9. One copy of this agreement should be retained by the secretary and one by the caretaker, the other copy being forwarded to the Live Stock Branch to be placed on file.

10 It is the duty of the directors, through the secretary, to see that the terms of their agreement with the caretaker are carried out. It should be understood that in no case does the department enter into official relationship with the caretaker. In the event of an officer of the branch finding that the caretaker is not living up to his agreement, it is with the secretary that the matter will be taken up, either through the inspector or by correspondence direct from the department.

11. It shall be the duty of the secretary of the association, upon being notified of the sickness or death of an animal, to communicate such fact immediately to the Live Stock Commissioner.

12. The Board of Directors shall make all arrangements regarding service fees with the party or parties in whose charge the sires are placed. Such service fees shall be sufficient to cover the cost of the care and management of the animals, including veterinary attendance, and, in the case of stallions also the insurance.

13. Each association shall, on or before February 1 of each year, forward to the Live Stock Commissioner a full report of the affairs of the association for the preceding year, covering the following points:—

List of members of association and their addresses.

Itemized statement of receipts and disbursements.

Copy of service record showing number of animals bred, the name of the owner in each case, the date of service and the fees charged, together with any other information which may be specially requested by the Live Stock Commissioner.

14. The membership fee of one dollar provided for under article (3) of the constitution must be collected annually from each member of the association. All money so collected remains in the hands of the association to cover incidental expenses and cost of veterinary attendance which may be found necessary throughout the year. In the case of small associations it is advised that during the first year at least no money collected as membership fees be applied on the cost of maintenance of any animals loaned to them.

Regarding the distribution of rams and boars, it is significant to observe that unifórmity of type in a district is being attained by means of this assistance. This is a feature to which not sufficient stress has been paid in America, and concerning which we can learn much from Europe and do well to adopt its methods in this respect. The branch restricts an association to the loan of one breed of each class, and further applications must be confined to the original selection.

RECORD OF PERFORMANCE.

The Record of Performance of pure-bred dairy cows continues to grow in popularity and extend its scope both as regards the number of animals for which applications are received and which qualify for entry. During the year, applications were presented from breeders in all the provinces of the Dominion, Manitoba having been included in the itinerary of the inspectors some months since. Owing to the extension of the territory and to the increase in the number of entries, it has been necessary to add two additional permanent inspectors to the staff.

NUMBER OF COWS FOR WHICH APPLICATIONS HAVE BEEN RECEIVED.

Holstein	641	Increase as compared with preceding year		75
Ayrshire	487	"	"	123
Jersey	159	"	"	44
Guernsey	30	"	"	15
French Canadian	17	Decrease	"	16
Shorthorn	77	"	"	13
Total	1,411	Increase	"	228

NUMBER OF COWS QUALIFIED.

Holstein	196	Increase as compared with preceding year		31
Ayrshire	123	"	"	4
Jersey	35	"	"	5
Guernsey	9	"	"	7
French Canadian	14	"	"	12
Shorthorn	36	"	"	27
Total	413	"	"	86

The records made during the year have not been remarkable, except in the case of the French Canadian and Shorthorn breeds. For both of these breeds records have been made which exceed any previous record made since the commencement of the test. Of Shorthorns, the two highest records are as follows:—

13,535 pounds milk; 540 pounds butter fat.

11,578 pounds milk; 530 pounds butter fat.

Of French Canadians, the two highest records are as follows:—

10,767 pounds milk; 453 pounds butter fat.

10,140 pounds milk; 413 pounds butter fat.

It should be observed that the higher average production of all cows qualifying, and the higher percentage of cows which qualify is particularly significant as regards this year's operations.

FEDERAL ASSISTANCE TO HORSE BREEDING.

A new policy, having in view the development of the horse industry in Canada, has been entered upon this year. Under this policy the farmers of any district wishing to work for the betterment of horse breeding by encouraging the use of sound, individually excellent, pure-bred sires, may form a breeders' club for the purpose of hiring a pure-bred stallion to travel their district for the benefit of the members. This club, by organizing under and adopting the constitution and by-laws and conforming to the various rules and regulations governing the grant, may participate in the assistance granted by the Government to such clubs, under the following conditions:—

1. The club shall guarantee the stallion owner a definite number of mares at a certain service fee per mare, said mares to be in good breeding condition, and not affected with any contagious or infectious disease.

2. All stallions named by clubs for the purpose of securing government assistance must be submitted to an examination by an authorized veterinary surgeon.

3. The secretary of the club shall forward to the Live Stock Branch, with the regular application, a list of its members, also a copy of the memorandum of agreement signed by both parties interested. This agreement shall not become binding until approved by the Live Stock Commissioner.

4. The minimum service fee shall be not less than twelve dollars.

5. All service fees shall be collected by the club.

6. Payment of service fees shall be made as follows: One-third of the service fee for each guaranteed mare shall be paid by the club to the stallion owner at the end of the service season.

7. The remaining two-thirds of each service fee shall be paid when the mare proves to be in foal. That is to say, the remaining two-thirds shall be paid for only such mares as prove to be in foal.

8. At the end of the service season the stallion owner shall furnish the Live Stock Branch with a sworn statement setting forth the number of mares bred to his horse, and the name of the owner of each.

9. The Live Stock Branch shall pay the club an amount equal to 25 per cent of the total amount paid at the close of the service season on the full number of guaranteed mares, on receipt of the stallion owner's statement and of a properly audited and sworn statement signed and declared by the president and secretary.

10. The Live Stock Branch shall pay the club a second grant equal to 25 per cent of the amount paid to the stallion owner on the total number of mares that prove to be in foal, that is, 25 per cent of two-thirds the service fee paid for each mare that proves to be in foal, on receipt of a properly audited and sworn statement signed and declared by the president and secretary of the club.

To the end of the fiscal year, two hundred inquiries have been received asking for information respecting the provisions of this new policy. Prominent breeders have expressed the opinion that this scheme would serve to direct horse-breeding operations throughout the country in a more systematic and progressive manner than has hitherto been adopted. A number of clubs have already been formed for the purpose of hiring stallions, and it is expected that several applications will be received before the beginning of the service season.

EGG AND WOOL EXHIBIT.

A very complete and instructive exhibit, under the supervision of the Sheep and Poultry Divisions of the Branch, was displayed at practically all of the larger western fairs, and at a considerable number of fairs in Eastern Canada. The wool exhibit illustrated samples of native-grown wool, and the processes of manufacture from the wool to the cloth. The egg exhibit pointedly drew attention to the loss sustained by faulty methods in production and marketing, and to the improvement that might be effected by the adoption of a more practical and scientific system. In addition, candling demonstrations were given for the instruction of the public generally, as regards quality in eggs.

Arrangements were made with the Canadian Pacific Railway for the loan of a large express car, and, in addition to the display of the exhibit in Western Canada, demonstrations were given at eighty-five points on the main line of the Canadian Pacific and Intercolonial railways in the provinces of Ontario, Quebec, New Brunswick, and Nova Scotia. The following table gives a brief statement of the number

of people who viewed the exhibit and who actually attended and took part in the demonstrations given in connection therewith:—

Western fairs	45,000
Miscellaneous, Eastern Fairs, including the Canadian National	76,000
Demonstration car points on lines of Canadian Pacific railway	24,000
Demonstration car points on lines of Intercolonial railway.	7,500
Total	152,500

Although 1914 was the first year in which assistance of this nature was granted to sheep raisers, and the scheme was not actually formulated until the shearing season in Eastern Canada had virtually commenced, a number of flourishing associations were organized and took advantage of it. The results show not only the benefits to be gained through co-operative effort in marketing, but also the greater financial returns derived from the presentation to the trade of a clean classified article. The grading was pursued under the instruction and supervision of the wool experts of the branch, and the wool was disposed of through avenues devised and controlled solely by members of the different societies. Grading increased the price of wool fully 4 cents a pound.

Most of the actual grading in an organized fashion was performed in the western provinces. Wool classifiers of the branch were utilized, however, in giving lectures and demonstrations and providing general assistance with respect to the preparation of wool to sheep raisers in Ontario, Quebec, and the Maritime Provinces. Their services were in constant demand, and a corollary of their efforts has been the abolition of the system of tubwashing in some districts, and the establishing of plans for the organization of several Wool Growers' Associations.

AMOUNT OF WOOL GRADED FOR EACH ASSOCIATION AND AVERAGE PRICE PER POUND.

Name of Association.	Amount of wool.	Average price per pound.
	Lb.	Cents.
Pontiac, Que	7,212¾	20¼
Manitoulin, Ont	15,742	20⅔
Manitoba	44,059	20
Calgary	6,942	19
Medicine Hat	60,231	19½
Bassano	27,840	21⅞
Carstairs	11,039½	19
Lacombe	9,935	19½
Central Alberta	18,216	21

THE EGG TRADE IMPROVEMENT CAMPAIGN.

Following the success that attended the efforts put forth in this direction, during the preceding year, the work has been extended to the maritime and to the western provinces. The progress which has already been made is significantly illustrated in

the very wide adoption, particularly in the province of Ontario and, to some extent, in Quebec, of the policy of loss-off buying, as contracted with the old case-count system, and in the attention which has been directed to the benefits of quality payment. The egg trade investigation has revealed the presence between the consumer and producer of a large class of egg buyers who have known little regarding the quality of the eggs which they handled. It should be made clear, of course, that this statement is in reference not to the wholesale trade, as such, but to the unorganized class of buyers who secure the product direct from the farmer. The campaign in the interests of improved systems of marketing is steadily obliging the egg buyer to further study the subject and to systematize and make more practical his method of handling eggs. The outcome of this movement should prove of economical advantage to the producer, and greatly reduce the loss finally charged against him resulting from wasteful unbusinesslike practices.

The action of the Canadian Produce Association at their convention, held at the Agricultural College, Guelph, January last, in adopting definite standards for Canadian eggs, will undoubtedly lead to marked improvement in trade conditions, as they may be expected to provide a definite and established basis upon which to inaugurate a system of quality payment.

EGG CIRCLE ORGANIZATION.

The most marked developments in this work have taken place in the provinces of Prince Edward Island and Ontario. In Prince Edward Island some twenty additional circles have been organized, the total of associations now being sixty-two, with a membership of between five and six thousand farmers. During the calendar year ended December 31, 1914, the product of eggs passing through the hands of the circle organizations aggregated in value $300,000, the price received being considerably in advance of the prices which would have been obtained through ordinary channels. A pronounced feature of this work lies in the fact that, since the farmers' association has entered upon the movement, the competition created has resulted in a distinct advance in price throughout the whole province, the campaign undertaken by the department having netted to all the farmers of Prince Edward Island, non-members as well as members, an increase of many thousands of dollars in excess of what would have been realized at current prices prevailing before the movement started.

In Ontario and Quebec, while progress, owing to the fact that farmers have not laboured under such a serious handicap, has not been so marked, there have been organized twenty-six associations, with a membership of 1,162, the value of the eggs co-operatively marketed approximating $80,000. In view of the tremendous development of the poultry industry in the western provinces, a systematic campaign with regard to the co-operative sale of eggs in that portion of the Dominion is now being arranged.

PATRIOTISM AND PRODUCTION.

In the French-speaking districts of Quebec the Agricultural Conferences held in connection with the Patriotism and Production campaign were arranged by the Live Stock Branch, and at 114 meetings, included in the first series, the attendance averaged

at least 200. It is reported that, in certain districts, the numbers present ranged from 300 to 800 people, and it is stated on good authority that these were the most effective Agricultural Conferences ever held in the province, the numbers of people present being 60 per cent in excess of the average attendance at rural conferences on other occasions. The interest on the part of the farmers was very keen, and evidently represented a desire on their part to meet the situation which was presented to them in an earnest and patriotic way. Large numbers of ladies were present at each meeting. The success of the campaign may be attributed in no small degree to the co-operation of the clergy of all denominations, and particularly of the curés of the various parishes. The publicity given the work in Quebec was due very largely to their efforts and, through their attendance at the meetings, and the appropriate addresses which they delivered, the movement for increased production in the province received a very strong impetus.

PUBLICATIONS.

In this branch, the following publications have been issued during the year:—

Pamphlet No. 1.—"Advantages of Sheep Raising." By T. R. Arkell.
" No. 2.—"Preparing Wool for Market." By T. R. Arkell.
" No. 3.—"Wool and its Manufacture." By T. R. Arkell.
" No. 4.—"Advice to the Beginner in the Selection of Breeding Stock." By T. R. Arkell.
" No. 5.—"Care of the Ewe and Lamb." By T. R. Arkell
" No. 6.—"Advantages of Dipping." By T. R. Arkell.
" No. 7.—"Practical Assistance to Wool Growers in the Marketing of their Wool Clips." By T. R. Arkell .
" No. 8.—"Care of the Ram and Ewes during the Breeding Season." By T. R. Arkell and Norman Stansfield.
" No. 9.—"Advantages of Docking." By T. R. Arkell and Norman Stansfield.
Leaflet No. 1.—"Rules for the Production and Marketing of New-Laid Eggs." By W. A. Brown and J. H. Hare.
" No. 2.—"The Importance of the Removal of Male Birds after the Breeding Season." By W. A. Brown and J. H. Hare.
" No. 3.—"Suggestions for Egg Circle Members." By W. A. Brown and T. A. Benson.
Pamphlet No. 3.—"The Candling of Eggs." By W. A. Brown and W. H. Ault.
" No. 4.—"The Organization of Co-operative Egg Circles." By W. A. Brown, B.S.A.
" No. 5.—"Plan of Permanent Laying House for Poultry." By W. A. Brown and T. A. Benson.
" No. 6.—"The Payment for Eggs According to Quality." By W. A. Brown, J. H. Hare and W. H. Ault.
" No. 7.—"The Egg and Poultry Situation in Canda." By W. A. Brown, B.S.A.
Report No. 6.—"Canadian Record of Performance."
Bulletin No. 17.—"Swine Husbandry in Canada." By J. B. Spencer, B.S.A.

The popular interest in these publications is evidenced by the large number which have been distributed, the major portion being sent out in response to individual requests. The attractive new bulletin edited by Mr. Spencer, and the short, concise, pithy pamphlets issued by the Sheep and Poultry Divisions respectively, have been in special demand. Particular mention should be made of the distribution of cardboard egg candling appliances, of which approximately 100,000 have been sent out upon request.

DOMINION EXPERIMENTAL FARMS AND STATIONS.

The activities of the Experimental Farms Branch during the year 1914-15 may be classified under three heads, namely, the continuation of experimental work already under way, the inception of new lines of experiment, and the establishment of additional Experimental Stations.

The year was a busy one in all these directions. Experimental work in animal husbandry, field husbandry, cereals, horticulture, forage plants, chemistry, botany, poultry raising, bee-keeping, and tobacco culture was actively pursued, although the field work was carried on under unfavourable conditions in many sections of the Dominion, owing to the prolonged drought. The results obtained in cereals, field husbandry, horticulture, and forage plants have already been published in summary form. Notes on a few features of the season and the work will be found farther on in this report.

Additions in area have been made to the Experimental Stations at Fredericton, N.B.; Rosthern, Sask.; and Scott, Sask.; which will permit of considerable extension of the work formerly carried on at those points.

Last autumn an Experimental Station was established at Summerland, B.C., and in March of this year another was located near Morden in southern Manitoba. At the former station the growing of crops under irrigation will be a main feature, while at the latter, horticulture for the Prairie Provinces will be given special study.

The organization and expansion of the work, both at the Central and branch Farms, has been greatly hampered by delay in getting necessary buildings erected. This has been felt more especially in the case of the animal husbandry work. It has been possible to build only some small workmen's cottages, poultry houses, etc., which were put up by day labour. The new barn at the Central Farm, also built by day labour, was finished during the year, and is undoubtedly one of the very best barns in Canada on the scores of convenience, light, ventilation, and hygienic conditions generally.

Although for some years past it has been the custom to make a small Experimental Farm exhibit at a few local fairs, this work was given special attention during this year. Several circuits of fairs were made up and an exhibit sent round each. The work was under the immediate supervision of Mr. J. F. Watson, of the Central Farm staff, and marked interest was aroused and success obtained. It is planned to still further enlarge this work during the coming year.

With the co-operation of the Publications Branch, an effort has been begun to increase greatly the mailing lists of the department, and it is hoped that by the close of the coming year, we shall be able to report a much larger list, made up entirely of those really interested in our publications.

In January last, a conference of superintendents and Central Farm officers was held. The main lines of present and proposed experimental work were discussed and planned, and the meetings, without doubt, did much towards making clear the aims of the Experimental Farms Branch and fostering a spirit of co-operation among its officers.

The following publications have been issued during the year, or are in the press at its close:—

In the Regular Series—

No. 78.—The Ventilation of Farm Buildings, by J. H. Grisdale and E. S. Archibald.
No. 79.—The Renovation of the neglected Orchard, by M. B. Davis.
No. 80.—Lime in Agriculture, by Frank T. Shutt.
No. 81.—Summary of Results in Cereals, 1914, by C. E. Saunders.
No. 82.—Summary of Results in Horticulture, 1914, by W. T. Macoun.

SESSIONAL PAPER No. 15

In the Regular Series—*Continued.*

No. 83.—Summary of Results in Field Husbandry, 1914, by W. Graham.
No. 84.—Summary of Results in Forage Plants, 1914, by M. O. Malte.
No. 85.—Hardy Roses, their Culture in Canada, by W. T. Macoun and F. E. Buck.

In the Second Series of Bulletins—

No. 17.—Forest Insect Conditions in British Columbia, a Preliminary Survey, by J. M. Swaine.
No. 18.—The Strawberry Root Weevil in British Columbia, by R. C. Treherne.
No. 19.—The Planting and Care of Shade Trees, by F. E. Buck.
No. 20.—The Farmer as a Manufacturer, by A. T. Stuart.
No. 21.—Tobacco Growing, by F. Charlan.
No. 22.—Growing Field Root, Vegetable and Flower Seeds in Canada, by M. O. Malte and W. T. Macoun.
No. 23.—Medicinal Plants and their Cultivation in Canada, by J. Adams.

Circulars issued—

No. 6.—Regulations under the Destructive Insect and Pest Act, governing the Importation, Sale, Shipment and Exportation of the Common or Irish Potato, by H. T. Güssow.
No. 7.—Potash in Agriculture, by Frank T. Shutt.
No. 8.—Manures and Fertilizers, by Frank T. Shutt.
No. 9.—The Control of Potato Diseases, by H. T. Güssow.

Pamphlets issued—

No. 13.—The Home Vegetable Garden and a Patriotic Gardening Competition, by W. T. Macoun.

In addition to the above, the first number of "Seasonable Hints" was brought out and attracted favourable notice. The main object in view in issuing this publication is to give the farmer notes of our results, or advice in regard to his farm work, more promptly than is possible through the medium of our reports and bulletins. It is not proposed to bring the "Hints" out at fixed intervals, but rather at such times as it is thought that it will prove of immediate value to the farmer in the work then occupying his attention.

In connection with the Exhibition work, a large number of Exhibition Circulars were published last season. These covered most of the principal lines of agricultural effort. New editions of these are being prepared for the coming exhibition season, and further circulars brought out as well.

Dominion Experimental Farms' Exhibit.

In the past, the Central Experimental Farm and some of the branch Farms and Stations have, when requested by exhibition managers, made a display at exhibitions and fairs in their respective localities; but until this year no organized programme has been followed in this connection. Furthermore, such exhibits as have been made have been more in the nature of a general display, principally to make known the existence of the Experimental Farms system, and representing the products of the particular Farm exhibiting. From inquiries made and questions asked by interested visitors at the exhibitions, there is evidence of the general desire for practical information on all lines of farm work. To meet this demand, early in the spring of 1914 the subject was brought under consideration, and it was decided to carry out an organized programme in the matter of attending exhibitions and fairs, with the object of not only making known the location of the Experimental Farms and Stations and the work they are doing, but also to make the exhibits educational and representative of the various lines of work being undertaken by the several divisions of the Central

Farm, as well as the branch Farms and Stations. Under the supervision of the Director of the Dominion Experimental Farms, Mr. J. F. Watson, of the Central Farm staff, was given charge of the work of bringing together representative exhibits from the various divisions of the Central Farm and the carrying out of the programme of attendance at exhibitions. The plan of organization adopted provided for assembling at the Central Farm five complete exhibits—each in charge of a practical man (either an Agricultural College graduate or student)—one for each of five circuits which included the principal exhibitions and fairs throughout the Dominion.

In accordance with this plan a Dominion Experimental Farms exhibit, including an exhibit from the branch Farm nearest to the place of exhibition, was shown at the following exhibitions: Shubenacadie, N.S.; Sydney, N.S.; St. John, N.B.; Charlottetown, P.E.I.; Quebec, Que.; Three Rivers, Que.; Sherbrooke, Que.; London, Ont.; Ottawa, Ont.; Winnipeg, Man.; Brandon, Man.; Regina, Sask.; Prince Albert, Sask.; Saskatoon, Sask.; Calgary, Alta.; Lethbridge, Alta.; Medicine Hat, Alta.; Vancouver, B.C.

From the reports received from exhibition managers and visitors, and from our own superintendents, we have evidence that the work this year in connection with exhibitions was productive of excellent results, and arrangements will be made to attend a larger number of exhibitions and fairs during 1915.

Division of Field Husbandry.

The aim of this division is to grow maximum crops at a minimum cost of production.

The work is practical in nature, including the following investigations now in operation on the various Farms and Stations throughout the Dominion:—

1. The investigation of the relative merits of different crop rotations. At the Farms and Stations in Eastern Canada and the province of British Columbia, the different rotations being tested are suitable to conditions where dairy or live stock farming is the line engaged in. For the prairie Farms and Stations the rotations are planned more particularly for the production of grain, as this branch receives as yet the special attention of the majority of farmers. In addition, a number of mixed-farming rotations are being tried to provide fodder crops for those who appreciate the advantages to be derived from a system which includes live stock and a variety of crops.

2. The study of methods of soil cultural treatment. To determine the cultural treatment best suited to the dry prairie soils, a series of soil cultural experiments were inaugurated and have now been running for four years at the six prairie Farms and Stations. The object of these experiments is to determine the best means of conserving moisture and soil fertility, and in the control and eradication of weeds.

3. The determining of the cost of production of field crops under ordinary farm conditions.

4. The demonstration of the value of underdrainage and irrigation.

5. The testing of different implements as to influence of size and character on the cost of production.

6. The comparison, to a limited extent, of various grains and forage crops as producers of food for live stock.

CHEMICAL DIVISION.

The work of the year, in its essential features, has been similar to that of the past, and has been carried on with the two-fold object in view—investigation and education. By the attack of problems affecting Canadian agriculture, some new facts have been added that must prove of service in the economic development of our basic industry, and by the dissemination of information through correspondence, bulletins, and reports, much assistance has been rendered the farmer that should be useful in the conduct of his everyday work. In all the activities of the division, the endeavour has been to keep in close touch with the man on the land, and study his difficulties and, in so far as it is possible by chemical means, to find a solution to the numerous questions that are constantly arising in the management of soils and the increase of their fertility, in the growth of crops and in the feeding of stock. No research has been undertaken that has not had for its object an immediate and practical end in view, one that might yield results that would be of service to agriculture as it is now practised in one or other of the districts throughout this wide Dominion.

In connection with the campaign "Patriotism and Production" that has been carried on throughout the Dominion during the early months of the present year, a number of special articles and bulletins have been written on subjects pertaining to agricultural chemistry. These, for the most part, have been brief accounts, couched in simple language, of the various means within the reach of the farmer for the maintenance and increase of soil fertility. The titles of the three more important publications issued as circulars or bulletins of the Experimental Farm are: "Potash in Agriculture," "Lime in Agriculture," and "Manure and Fertilizers." It may be added that there has been a marked response on the part of the farmer to the announcement in this campaign that all possible help would be afforded him through information and advice; the correspondence of the division has increased considerably by reason of this appeal or offer during the past three months.

During the year, 3,829 samples have been received and entered for examination or analysis. Many of these have been collected in connection with our own investigations, but the number sent in by farmers is very large. As far as time permits these latter are examined and reported upon. Every effort is made to furnish these correspondents with the information they desire with as little delay as possible, but necessarily in such times as these, when the work is not only increased but the staff has suffered through enlistments for active service, it has been impossible to attend to all demands as promptly as might be desired.

The number of samples submitted for chemical and microscopical examination by the Meat Inspection Division Health of Animals Branch, for the year just closed, has been 662. This is a very considerable increase over the number of the previous year, and has necessitated the appointment of further expert assistance for the satisfactory accomplishment of the work involved. The samples comprise preserved meats, condiments and species, dyestuffs, preservatives, etc., etc., collected at the various packing houses in Canada, the examination being made with a view of determining their nature, purity, and character of adulteration, if present.

An enumeration of the more important investigations that have been carried on during the year may be given as follows:—The analysis of soils from large and yet uncropped areas in Western Canada; the determination of the "alkali" in soils in certain areas in Alberta with a view of determining the suitability of such lands for cultivation; the influence of cultural operations and various systems of cropping on the soil moisture of lands in districts of sparse and uncertain rainfall; the influence of climatic and soil conditions on the quality of wheat; the relative feeding value of field roots; the value of sugar beets for factory purposes as grown in various parts of the Dominion; the character of the water supply as found on Canadian farm homesteads; the fertilizing value of rain and snow as measured by their nitrogen content; the potash and nitrogen content of the seaweeds on the Pacific and Atlantic seacoasts, and the manufacture of a fertilizer by the drying and grinding of seaweed.

Division of Horticulture.

The work of the Horticultural Division, as of other divisions of the Experimental Farms Branch, is not confined to the Central Farm at Ottawa but extends over the whole system of Experimental Farms, hence it is desirable from time to time to draw attention to the work at the branch Farms and Stations. Certain uniform varietal and cultural experiments with fruits, vegetables, and ornamental plants are carried on at practically all the Farms and Stations, the object being to obtain results which when compared will show the influence of the climate and soil in different parts of Canada on varieties and on methods of culture. Very valuable information has thus been and is being accumulated, which is available both to new settlers and to those who have been living some time in a district served by an Experimental Farm. This information when used by the settlers saves much loss from buying unsuitable plants and from adopting cultural methods which are not the best for a particular kind of climate of soil.

While the Experimental Stations may be divided into Maritime, Eastern, Prairie, and Western Farms, it is found that so far as horticulture is concerned the climate at each Farm and Station throughout the Dominion is sufficiently different to make the work of each Station of special value to the district it serves.

In 1914 the Dominion Horticulturist visited the branch Farms and Stations, as in other years, and discussed the horticultural work with the superintendents, and rendered what help he could.

At the Experimental Station at Fredericton, N.B., which is a comparatively new one, 11 acres of orchard were set out in 1914, consisting of apples, pears, plums, and cherries. Bush fruit plantations were also established and varietal and cultural experiments with vegetables and flowers continued. It is expected that the work with apples will prove of particular value at this Station as the St. John River Valley is admirably adapted to certain types of dessert apples, and it will be the endeavour to obtain additional varieties which will extend the season of high-class fruit. To this end the new varieties originated at the Central Farm are being thoroughly tested. The potatoes grown in New Brunswick have already made a name for themselves, and particular attention is being paid to this crop at the Fredericton Station. A large

collection of varieties was tested in 1914, and various methods of culture are being tried. Some of the varieties tested in 1914 proved considerably more productive than the Green Mountain, which is the variety generally grown.

The plantations at the Experimental Station at Kentville, N.S., were extended in 1914. With the many cultural experiments which are under way here this Station should in a short time prove of great value to the fruit grower of the Annapolis and adjacent valleys. As there were practically no bearing trees on this Station when it was established, and as spraying and thinning experiments covering a number of years seemed badly needed, orchards at Falmouth, Berwick, and Bridgetown were rented, and during the past two seasons a series of experiments have been conducted which already have given some valuable results especially in regard to the time of spraying.

At Charlottetown, P.E.I., and at Nappan, N.S., hardier fruits are required than at Kentville, and these Farms are showing that if the proper varieties are planted good returns can be obtained from fruit.

The Experimental Stations at Cap Rouge and Ste. Anne de la Pocatière, Que., have already good orchards established, and at the former Station a number of apple and plum trees fruited in 1914, although the orchards are very young. At Cap Rouge, considerable attention is being paid to the selection of home-grown vegetable and flower seeds. Samples of the seed were sent out for trial in the province of Quebec in 1914 with gratifying results.

While the Experimental Station at Lennoxville, Que., was established too recently to do much in horticulture in 1914, preparation was made for the work of 1915, when orchards and other plantations will be set out. A nursery was, however, established in order to have plants ready for the permanent planting. Some work in the selection of potatoes was also carried on.

On the six prairie farms, the horticultural work is being pursued with vigour, and much valuable information accumulated. At Lethbridge, Alta., apple trees are standing the climate very well, and in 1914 such hardy varieties as Yellow Transparent, Duchess, Charlamoff, Hibernal, and others bore fruit. The trees are thrifty and give promise of continued crops. At the other Farms and Stations, results with apples have not been so favourable. Crab apples have, however, fruited at all the prairie Farms, and as these hybrids require little or no protection by windbreaks they are a great boon to the settlers. Small fruits do well, and the prairie Farms are noted for their small fruits, fine vegetables, and beautiful flowers.

At Invermere, B.C., the results of the work for 1914 showed that excellent vegetables could be raised there, that small fruits promised well, and that the hardier varieties of apples withstood the winter of 1913-14.

The horticultural work at the Experimental Farm at Agassiz is now somewhat limited. The collection of ornamental trees and shrubs containing many species tender in most parts of Canada, and under test for from twenty to twenty-five years, is a good demonstration of the mildness of the climate, though the experience in the past with tree fruits shows that care must be exercised in the planting of varieties. A farmer's fruit plantation established in 1913, and containing the varieties which

experience had shown were best adapted to this climate is a feature of this Farm. The trees and bushes in this did well in 1914.

Much horticultural work was accomplished at the new station at Sidney, Vancouver island, in 1914. Land which had been in heavy timber little more than a year before had been brought into good condition, and about 15 acres were planted to fruit in 1914. Owing to the very mild climate of this part of British Columbia, fruits are being tested which would not succeed where there was much frost. Apples, peaches, pears, plums, cherries, apricots, nectarines, quinces, persimmons, figs, and even citrous fruits are being tried; while among nuts the English walnut, chestnut, filbert, and almond are being grown. A plantation of English holly was set out, as the berries of the holly are in great demand in the winter, and bring good prices. A small plantation of the Cascara (*Rhamnus Purshianus*), which is a native of British Columbia, was also put out to learn how long it takes for it to reach marketable conditions. Many other economical plants are being tried. It is planned to have at this station as complete a collection as possible of the trees and shrubs of North America, and a good beginning was made in the establishment of this in 1914.

At the northern substations, such as Fort William and Grand Prairie in the Peace River district and at other places farther north, much useful information in regard to most suitable varieties is being obtained that will prove of much value to settlers as they come into these new districts.

The work at the Central Experimental Farm, Ottawa, is constantly growing with the addition of new Farms, but apart from the attention required in connection with these, an increasing amount of experimental work is going on at this farm itself. The new greenhouses to which reference was made last year have proved very satisfactory. One of the most interesting tests made during the past year in these houses was one with European grapes in large pots. The vines bore well, and good fruit was ripened. A Black Hamburg vine yielded over 10 pounds of good grapes. The advantage of having the vines in pots is that in small greenhouses where space is valuable the vines, after fruiting, may be put outside and later stored in a cellar for part of the winter, thus making the space they occupied available for something else. Such crops as tomatoes, lettuce, raddish, cauliflower, melons, cucumbers, and beans were grown to obtain information as to the best varieties and methods of culture. A very fine show of chrysanthemums of the best varieties attracted much attention in the autumn.

Fire pots have been used for some years in western orchards in the United States where frosts at blooming or ripening time are liable to occur, in order to raise the temperature in the orchard, and prevent frost. Some 400 of these were obtained for the Central Farm in 1914, and tests were made, the object being to prevent frost in truck crop and strawberry plantations. While the frosts in 1914 did not come when it was possible to demonstrate the saving of a crop by this means, the experiments showed that it was possible to raise the temperature sufficiently, and further experiments will be continued in 1915.

Autumn-bearing strawberries have been advertised for a number of years, but until recently there were none which seemed worthy of recommendation, but the

Progressive, a comparatively new sort, gave such good results in 1914 that it merits attention. On a small plot which yielded at the rate of 9,982 pounds per acre, 5,649 pounds ripened between July 22 and September 25, after the regular strawberry season was over.

A small orchard of Wealthy apple trees planted 10 by 10 feet apart in 1896 has given some very interesting results, and shows the possibility of profitably treating some early-bearing varieties of apples in this way. The total net profits per acre for the nineteen years 1896-1914 are $1,719.28, or an average per year of $90.49. The trees have been thinned from time to time, the least productive being removed, and there are now less than half there were nineteen years ago.

The work in plant breeding was continued in 1914. In addition to the many promising new apples now fruiting as the results of past work, the results with early vegetables have been very gratifying, and the continued development of better varieties is anticipated. The ornamental grounds at the Central Farm are becoming more attractive every year, and the large collections of flowers which are available for study are much appreciated. Through the Horticultural Division much is being done to get Canadians to have a desire for more beautiful homes and, with more beautiful houses, we shall have a more attractive Canada.

Cereal Division.

On the whole, the season of 1914 was not very favourable for cereal crops in Canada, because of the severe drought which was experienced over large areas of country. Western Quebec and eastern Ontario were very dry during the early part of the season, and southwestern Saskatchewan and southeastern Alberta suffered acutely throughout the whole summer. Those districts which had a moderate or good supply of rain gave excellent crops, especially central Alberta, southwestern Ontario, and parts of the Maritime Provinces.

The crops on most of the Experimental Farms and Stations were good, the methods of seed selection, soil cultivation, etc., employed being such as to reduce to a minimum the damage caused by drought or other unfavourable weather.

Experimental work with cereals was, of course, somewhat interfered with by the abnormal conditions, but valuable results were obtained, nevertheless, at all the Farms.

MARQUIS WHEAT.

Marquis wheat, though still a comparatively new variety, having been introduced by the Dominion Cerealist in 1909, has now for the fourth time in succession won the highest possible award on this continent in international competitions. The latest victory in the series was at the Dry Farming Congress at Wichita, Kansas, last autumn, when an exhibit of Marquis grown by Mr. Seager Wheeler at Rosthern, Sask., was given the highest score. Marquis now holds, almost undisputed, the first place among varieties of spring wheat in Canada. It is also highly esteemed in some of the United States which touch the Canadian border, and it has given an excellent account of itself in Colorado, at high altitudes, where early-ripening varieties are needed.

PRELUDE AND PIONEER WHEATS.

These two very early-ripening varieties which have only been before the public for a short time have shown themselves very well adapted for districts for which there hitherto been no suitable sort. Prelude, by its extraordinary earliness, makes wheat growing profitable in localities where ordinary varieties are almost always damaged by frost late in August; and Pioneer, though a less useful sort, is the only very early wheat yet introduced which is at all suitable for dry districts.

OTHER GRAIN.

The production of new varieties of grain other than spring wheat is not making such rapid progress, but very many new sorts of barley, peas, oats, and flax are on hand; and excellent results are looked for, as soon as these new sorts shall have been sufficiently studied to ascertain which will best meet the needs of the farmers.

CROSS-BREEDING AND SELECTION OF CEREALS.

The foundation work of cross-breeding and selecting cereals is being continued as usual at Ottawa. Among the most interesting new types recently produced may be mentioned a series of beardless barleys, the characteristics of which are most unusual. It is hoped that some of these new sorts will prove valuable. In wheat, the latest crosses made have had in view the production of still better types of the earliest ripening habit, aiming especially to eliminate the tendency to shed the grain under the influence of high winds.

MILLING AND BAKING.

The researches in milling and baking have included the usual extensive tests of new kinds of wheat. No new variety is introduced from Ottawa until it has proved itself of very high baking strength in at least two seasons, when grown in different climates.

The studies of the effects of storage on flour have also been continued, and experiments have been conducted with a view to obtaining more precise information in regard to the exact conditions necessary for the production of the best bread.

FREE DISTRIBUTION OF GRAIN AND POTATOES.

The usual annual distribution of small samples of seed grain and potatoes is being carried on this winter. Owing to the very dry weather last season at some of the farms where the seed grain was produced, the quality of part of the material for distribution is not quite so good as usual; but every effort is made to ensure that only grain of the very highest possible degree of purity is sent out. The grain is, of course, always cleaned by the best machinery known, and when necessary it is also hand picked, so that there can be no adverse criticism as to the freedom of the samples from weed seeds and foreign grains. This annual distribution is doing great good by promoting the cultivation of the best varieties of grain in pure condition.

Division of Botany.

During the year of report, the staff of the Division of Botany devoted much time to the increasing number of inquiries for information, which is received every year from farmers and other persons interested in subjects relating to economic botany and plant diseases.

FARM WEEDS.

Among the more important subjects may be mentioned the identification of weeds and Canadian plants. The weeds sent in to us have been identified, and advice was given relating to the most practicable means of their eradication as far as known. The purity of the seeds of agricultural plants, i.e., their freedom from weed seed, which are being analyzed by a special branch of the department, has unquestionably been attended by good and satisfactory results, shown by the improvements of seeds offered for sale; but the persistence of certain noxious weeds and the longevity of weed seeds in the soil causing weeds to rapidly appear on newly-broken land or on arable land as soon as the plough is used thereon, make it desirable to study, with the least delay possible, the most practicable and effective means to rid the farms of the Dominion of the weed pest. A knowledge of successful methods for the extermination of weeds would add an immense amount to the wealth of the country.

During the summer, one of the members of the staff spent several weeks in the West collecting exhibition specimens of the common weeds of Western Canada. Seedlings of the same weeds were raised in Ottawa to obtain the various stages in their development. It is intended to prepare a comprehensive exhibit of the weeds of Canada, showing their life-history from seed to seed. It would be a great advantage to farmers were they able to recognize noxious weeds in their earliest stages of development, and not allow them to produce flowers and seeds. The earlier a weed is recognized to be harmful and is destroyed, the greater will be the saving of time and trouble, which are inevitable once the weed is firmly established. The specimens so far collected have been carefully preserved, and are being arranged for exhibition in a unique and original manner, which will prove most useful for the purpose. The number of weeds and wild plants identified during the year was 955.

DESTRUCTIVE INSECT AND PEST ACT.

It will be remembered that an embargo was laid, December, 1913, on Canadian-grown potatoes by the United States, when it was determined that a form of scab said to be not widely prevalent in the United States of America existed in some parts of Canada. In June, the Dominion Botanist was instructed to confer with the experts of the United States Department of Agriculture concerning any conditions, under which the embargo might be removed. It was agreed to remove the embargo subject to certain rather complicated regulations being enforced by the Dominion under above Act. These conditions required the delineation of the infected area and certification of all potatoes, after inspection of farms and of potatoes prior to shipment from such area. The enforcement of the condition required the immediate

employment of nearly thirty temporary inspectors, besides a considerable expenditure in supplies. Previous to the passing of these regulations by an Order in Council, they were discussed with the most interested parties, i.e., the shippers of New Brunswick, who unanimously declared themselves in favour of same. The regulations were then duly passed, November 4, 1914. The inspectors appointed received a special training at the Central Experimental Farm, and inspection work began in December, 1914.

From December 13, 1914, to February 26, 1915, 49,343 bushels were certified for export to the United States. From the same date to March 31, 36,689 bushels of "First Grade" and 440,038 bushels of "table grade" potatoes were inspected and certified for Canadian points. In all, 526,070 bushels of potatoes have been examined and certified during these months, all from the province of New Brunswick. On February 26, a car of Canadian potatoes was rejected by the United States inspector at Boston for presence of powdery scab. On inquiry at Boston by an official of our department, it was learned that the official United States Potato Disease Inspector found two potatoes slightly affected with powdery scab after a search of seven hours. In accordance with the United States requirements governing the importation of foreign potatoes, the permits issued were cancelled, and further permits were refused. Since that date, no further export of Canadian potatoes took place to United States points.

From our experience with powdery scab in Canada and in Europe, and from the experience of other plant pathologists of repute in Europe, we are more inclined than ever to regard this disease as one of minor importance and not warranting any such drastic measures. The time will come, no doubt, when the United States authorities will change their attitude towards the disease, particularly since it has been discovered in the states of Maine and New York.

Owing to the large crop of potatoes both in Canada and the United States, the market for this commodity was unusually slow. The inspection, quite aside from the question of powdery scab, has been found to improve greatly the quality of potatoes, which will prove of benefit to the grower as well as the shipper.

Mr. John Adams, the Assistant Dominion Botanist, was absent for several weeks in Prince Edward Island, where he delivered a series of lectures explaining the nature of powdery scab and the new potato regulations.

EXPERIMENTAL AND OTHER WORK OF THE DIVISION.

A large number of specimens of diseased plants of all kinds and cultures were sent in for examination and advice. As a microscopical and cultural examination is necessary in most of the cases to determine the cause, it will be obvious that the staff's time was much taxed, when it is stated that some 400 diseased specimens have been examined. The experimental work connected with plant diseases included a series of experiments on potato diseases. The prevention of common scab, powdery scab, the investigation into the nature of other obscure potato diseases like mosaic, leaf roll, curly dwarf, and net necrosis form still a large part of the work of the scientific staff.

The Dominion Botanist, during the month of July and part of August, participated with a number of plant pathologists in a field survey of potato diseases in the United States. Such visits prove to be of great value to the grower, who becomes more interested in this work, as he is instructed and gains the knowledge enabling him to recognize the diseases prevailing in his own cultures. A similar trip was made through New Brunswick, where such work is greatly needed. It is intended to extend this operation towards other localities and other agricultural and horticultural crops.

THE ST. CATHARINES FIELD LABORATORY.

The work of the laboratory under the able charge of Mr. McCubbin is proving of greater value every year. A very comprehensive study of the most common fruit diseases has been made and a very instructive bulletin on the subject is in the press. The advantage of being in close touch with the fruitgrowers and of demonstrating the control of any disease and of investigating the cause of diseases of more recent appearance under the eye of the farmer are being more and more realized. To prepare the ground for the intelligent understanding of diseases of plants, Mr. McCubbin has held a number of classes, explaining the nature of disease-causing organisms, their biology and the reasons for the control measures adopted. These meetings were very satisfactorily attended.

PUBLICATIONS.

The following publications have been issued or are in the press:—

Exhibition Circulars—

No. 44. Potato Scab, by J. Adams.
45. Do you know your Weeds?, by F. Fyles.
46. Apple Scab, by F. L. Drayton.

Bulletins—Circulars—

The Control of Potato Diseases, by H. T. Güssow. (Circular No. 9.)
Medicinal Plants and their Cultivation in Canada, by J. Adams. (In the press.)
Fruit-tree Diseases, by W. A. McCubbin. (In the press.)
Regulations under the Destructive Insect and Pest Act governing the Importation, Sale, Shipment and Exportation of the Common or Irish Potato, by H. T. Güssow. (Circular No. 6.)

Division of Forage Plants.

The work hitherto carried out by the Division of Forage Plants has included:—

1. Variety tests, with the object of securing data bearing on the suitability or unsuitability for different parts of Canada, of already established varieties of the different groups of forage plants.

2. Breeding work, with the object to produce new varieties of forage plants superior to those already in existence and better suited to the various climatic and soil conditions existing in different parts of the country.

3. Investigations, chiefly of a systematic nature on wild grasses and other plants forming parts of wild hay and pastures.

During the year, a new line of work has been taken up by the division, viz., production of seed of forage plants, and particularly of field roots.

VARIETY TESTS.

In order to eliminate, as much as possible, the disturbing influence of soil variation on the variety tests, it was decided, in 1913, to arrange all experiments in duplicate plots. The value of duplication has been demonstrated during the past two years, and, as far as the experiments at the Central Farm are concerned, more particularly so during the year 1914-15.

Through the duplicate-plot system, fairly reliable information on the comparative yielding capacity of different varieties has been secured.

The real value of a variety depends, however, not upon its yielding power alone, but also on its chemical composition. This is true especially of Indian corn and field roots. The real food value of a variety belonging to these groups of forage plants should therefore be calculated from tonnage and chemical composition, taken together. This method of determining the comparative food value of different varieties of field roots and Indian corn has been followed, during the year, at the Central Experimental Farm, and has already proven of great advantage.

BREEDING WORK.

The division has well under way breeding work with alfalfa, red clover, alsike clover, timothy, orchard grass, and a few other grasses.

Up to the present the breeding work with the clovers has mainly had for its object the production of perfectly hardy varieties, i.e., varieties able to come through the most severe Canadian winters without being wholly or partially killed. The methods used to achieve this object consist simply in a mass-selection and propagation of such forms and types which have been able to winter successfully under unfavourable conditions. The results already obtained indicate beyond doubt that by the propagation of such hardy types, varieties can be produced which, as far as hardiness and, as a result thereof, productiveness are concerned, far excel varieties now obtainable. They also indicate that home-grown seeds gives better crops than seed imported from somewhere else.

With a view of obtaining, not only hardy varieties of clover, but also uniform ones of superior yielding capacity, breeding has also been started from individual plants of red clover and alfalfa. This work which was started in 1913 is progressing very satisfactorily but, owing to its nature, no definite results can be expected until after several years.

The breeding work with grasses which was started in 1912 has for its object the production of high-yielding and uniform strains. At present seventeen "families" of timothy, each represented by sixty-five individual plants, secured through self-fertilization, are under observation. Many of the "families" display a remarkable uniformity in general appearance, while others seem to be uniformly resistant to drought and rust.

FIELD ROOT SEED PRODUCTION.

With a view of improving old varieties of field roots by breeding, preparatory experiments were started with mangels and turnips on a small scale in 1914.

In 1914, when the conditions in the root seed producing countries of Europe threatened to make a normal supply of seed impossible, steps were taken to secure data bearing on the possibility of producing field root seed profitably in Canada. As large quantities as possible of suitable mangels and turnips were selected as seed roots for the year 1915.

HERBARIUM.

The herbarium material of grasses and kindred plants necessary for the proper understanding of the nature and merits of natural pastures, and of hay made from wild grasses, is steadily being increased. In addition to a vast collection of grasses made by the Dominion Agrostologist in Western Canada, about 800 sheets of European grasses and sedges were secured through exchange.

EXHIBITION COLLECTIONS.

About 1,400 exhibition specimens have been secured during the year. A large number, representing 175 different species, have been exhibited in the Canadian Pavilion at the Panama-Pacific International Exposition, San Francisco, California.

The balance have been left at the disposal of the Division of Extension and Publicity.

Animal Husbandry Division.

This division of the Central Experimental Farm has, during the past fiscal year, continued to expand rapidly. The scope of work, briefly, is the laying out and superintending of the feeding, breeding, purchasing, management, and housing of farm animals; the manufacturing and marketing of their products, together with all routine and experimental work connected therewith, on the Central Experimental Farm; and, in consultation with the Director of the Experimental Farms and Superintendents, the supervision of similar work on the branch Farms and Stations.

The work on the Central Experimental Farm, Ottawa, during the past year has been somewhat handicapped by the lack of buildings. However, during the year the new buildings replacing those which were destroyed by fire in October, 1913, were completed. The work of planning these buildings and supervising the construction fell largely to the Dominion Animal Husbandman, under the direction of the Director of the Experimental Farms. This new building is eminently satisfactory, and illustrates a great many features of modern barn construction, both as to simplicity, economy, efficiency, and durability.

LIVE STOCK ON THE CENTRAL FARM.

The horses on this Farm are all of draught type, excepting the necessary drivers. Although the majority of the horses kept were geldings, yet an increasing number of mares are being maintained for breeding purposes. A number of these mares are in foal, and it is to be hoped that breeding operations may be successfully carried on.

Beef cattle work has been discontinued for the time being, owing to the lack of proper buildings. This important work will be re-established as soon as it is found expedient to construct the necessary housing facilities both for breeding and feeding stock.

Dairy cattle continue to receive increased attention. Representatives of five breeds, namely, Ayrshire, French-Canadian, Guernsey, Holstein, and Jersey are maintained, all of which have shown excellent returns. Milk production was naturally largely diminished when the buildings were lost, but all herds are now built up to their normal strength. Many pure-bred animals from these herds are annually sold for a moderate price. It is the object of this phase of the work to distribute the best of pure-bred males in districts where the greatest amount of good may follow.

Many valuable breeding animals have again been furnished to the branch Farms in order to build up other herds and flocks. Experiments in breeding and feeding of dairy cattle have been rapidly extended, and many new and valuable phases of investigation work are being given attention.

The sheep on the Central Experimental Farm are very much improved, in numbers, quality, and condition. This marked improvement is again due to the utilization of farm roadsides for pasture. Although this method of pasturing sheep is somewhat more expensive than the open pastures, yet it keeps the roadsides in splendid condition. Owing to the limited area, only two breeds are maintained, namely, Shropshire and Leicester, and from these flocks a number of excellent breeding animals were distributed to the branch Farms and Canadian farmers.

Swine raising has again demonstrated itself as one of the best paying branches of the live stock work. Yorkshires, Berkshires, and Tamworths have been kept; from which herds again large numbers of young pure-bred animals have been sold for breeding purposes. A large number of feeding experiments have been conducted during the year. These experiments, dealing with milk substitutes, the economic values of farm and elevator products and by-products, and the like, will be of distinct value to many of the farmers in Canada.

Experimental work along the lines of producing and marketing dairy products has been conducted during the year. This department alone has shown gross receipts of over $11,000 and, at the same time, in addition to the experimental work, has distributed a large amount of information to farmers.

NEW BARN, CENTRAL EXPERIMENTAL FARM.

The new cattle barn at the Central Experimental Farm includes the main barn and two wings to accommodate bulls and calves. Although this barn could not be considered a farmer's model barn, due to the fact that many arrangements are specially made for the carrying on of experimental work, nevertheless the modern features of an up-to-date economic barn are well illustrated. Many different types of fittings, floorings, dimensions, and arrangements, both for the cattle and for the handling of the foodstuffs, are being tried. In addition, two different makes of silos, namely, a home-made reinforced cement block and a vitrified clay tile, are being experimented with. In the course of another two years' use a large amount of data of economic value to the farmers will be available for distribution.

ASSISTANCE TO BRANCH FARMS.

By visiting the branch Farms and Stations throughout Canada, the Dominion Animal Husbandman has been brought closely in touch with their work. Under the supervision of the director considerable assistance to the superintendents has been given in the laying out of new lines of live stock experimental work and in better conducting and systematizing such work as has been in progress for some time. A large number of sketch plans of buildings proposed for the branch Farms have been made and, approved by the director, have been placed in the hands of the Public Works for completion. By this means of co-operation, building work on the branch Farms will be facilitated and buildings will be constructed which are more economical and better adapted both for the purpose which they are intended and as an example for visiting farmers. Already such buildings which have been constructed on the branch Farms have shown a marked beneficial influence in the neighbourhood and province which each Farm represents. Many features of these buildings are being copied, in their essentials at least, by a large number of both the small and extensive live stock breeders.

MISCELLANEOUS.

A large number of blue prints and photographs of modern farm buildings have been distributed to farmers contemplating the erection of new farm buildings. Brief specifications have also been distributed for many of these.

The regular correspondence along the lines of maintenance of live stock, feeds and feeding, methods of breeding, and the like, has largely increased during the past year, showing the greater confidence which the farmers have in the work of this division, and the greater interest which they are taking in this work.

The members of the staff of this division have judged at many of the agricultural fairs throughout Eastern Canada, and have addressed a large number of meetings, throughout the year, on live stock subjects, as well as assisting in the campaign for "Patriotism and Production."

Poultry Division.

GENERAL EXPANSION.

Since the reorganization of the Poultry Division two years ago, the work has been gradually increasing, and the demand for still greater expansion is more and more apparent. For, though so much has been done to encourage the producer, Canada, according to the customs returns, even yet does not produce sufficient eggs to feed herself.

This division aims to help the farmer who keeps a small flock of hens, as well as the man who depends upon his flock for a livelihood, and with this end in view many of the problems that face the producer are receiving attention, and as the laboratory equipment at Ottawa is increased, research in more of these will be instituted. Among the questions that are receiving immediate attention are: Better housing; cheaper feeds; healthier stock; more suitable varieties; decrease of mortality; incubator problems; better and stronger fertility; higher average egg-yield; larger eggs; better preparation for market; best methods of shipping eggs for hatching, day old chicks,

and breeding stock; the production of early winter eggs; a more even distribution of what the producer has to sell; the practicability of water fowl on the farm; the prevention or cure of blackhead in turkeys, as well as a number of other common diseases to which poultry of all kinds are subject.

Eleven of the branch Farms and Experimental Stations this year are equipped for work in poultry, where practical demonstrations are being conducted. At the Central plant the stock has been more than doubled during the past year, and a good beginning has been made with turkeys, geese, and ducks.

UNUSUAL CONDITIONS.

The past year has been remarkable in that prices for feed have been unusually high, while those received for the produce have not averaged quite as high as usual. Though the war may not have been entirely responsible for these conditions, there is no doubt that it intensified them, bringing up the price of feed and causing the prices paid for the produce to fluctuate considerably. In many cases producers complained that the cost of production was considerably more than the prices received for the produce, and though this may be true, there is no doubt that an experience of this kind should help the industry, in that producers will study how to produce more cheaply and how to market at the right season and without the usual waste that accompanies this system in Canada.

BUILDINGS.

The three small buildings erected at the Central plant a year ago have proved very helpful in the work. The experimental breeding house has made it possible to carry on some special mating experiments. The cockerel house has served for the purpose for which it was originally intended during the winter months, and has proved to be a satisfactory brooder house for chicks in the spring and summer; the feed and storehouse has rendered this end of the work more convenient, and the basement is being utilized as an incubator cellar.

The new administration building which was expected during the year has not yet been built and, because of this, the old buildings are still retained, but it is hoped that this building will be available very soon, when laboratory space will be procured, and more investigational work taken up.

THE WATER-FOWL PLANT.

Upon the area of land and water which was inclosed last year for a duck plant a small cottage for the attendant has been erected, and during the year this plant was utilized for the water-fowl. This spring breeding turkeys also were placed there. This makes an ideal spot, especially for the water-fowl, as considerable water is included inside the fence. Small yards reaching to an artificial pond have been constructed for the use of the breeding stock early in the spring before the water comes into the canal.

This addition to the Central poultry plant provides a much-needed range and makes it possible to carry on work that has been in contemplation for some time. It also adds to the general appearance by turning a wild land into a water-fowl park.

THE EQUIPMENT AT THE BRANCH FARMS.

The poultry plant at each of the branch Farms and Experimental Stations is more for the purpose of demonstration than experimentation, and therefore comprises what might be considered ideal conditions for a farm poultry plant that is run on a commercial basis. Some of these Farms have their complete equipment, which includes houses of various types and sizes sufficient in all to accommodate between three and four hundred laying hens; incubator and brooder equipment to reproduce from one-half to two-thirds of the flock each year; an administration building, the basement of which is used for an incubator cellar, the first floor for office, bed-room and feed-room, the attic for storeroom.

This is called a one-man poultry plant, in that the work done on the plant is accomplished by one man, who also has time to carry out some experimental work and is prepared at any time to show visitors through the plant.

STOCK.

The stock includes ordinary fowl (hens), turkeys, geese, and ducks. The varieties, as a rule, are those which are considered to be more or less of a general-purpose character and suitable chiefly for farm conditions. All the branch Farms that have poultry plants keep hens, though only those specially situated have turkeys or water-fowl.

Seventy-five per cent of the hens on the branch Farms belong to the general-purpose breeds, such as Rocks, Wyandottes, etc. The remaining 25 per cent are White Leghorns, the most of which are at Agassiz, B.C., and Lethbridge, Alta., where the climate is better adapted to tender varieties, but even here it is found that the general-purpose breeds are giving better satisfaction, and as a consequence the proportion of lighter breeds will be diminished.

At the Central Plant.—During the past year the stock at the Central Experimental Farm has been materially increased. On January the first, 1915, there were 849 birds, 146 of which were water-fowl, turkeys, and guineas. Of the fowl, the Barred Rocks predominated, with White Leghorns second. These were followed by several pens of White Rocks and White Wyandottes, and smaller lots of White, Buff, and Black Orpingtons, Black and Brown Leghorns, and Black Minorcas, besides single matings of several other varieties. In ducks there were several matings of Indian Runners, Pekins, and Cayugas, and a pen each of Aylesburys and Rouens. In geese, Toulouse, Embden, African, and Wild were represented; and the variety of turkeys was Bronze.

At each Branch Farm.—About 300 laying hens are kept at each of the branch Farms. As a rule 200 of these are pullets and 100 year-old hens. The pullets are tested the first year by the trap-nest, and are fed for egg production, and 100 of the best of these are kept until the following year, when from them eggs are taken in the breeding season for hatching purposes.

With this arrangement it is necessary to mature 200 selected pullets each year: this means that at least five or six hundred chicks are raised to maturity. About 50 per cent are cockerels, the best of which are retained for selling as breeders to the farmers. Of the 300 pullets, 200 are selected for the laying pens.

From one to four varieties are bred at the branch Farms, though it is not the intention to keep too many varieties, but rather to eliminate those which are the least satisfactory, and confine attentions to the one or two which prove most practical for the locality.

The hens, that is those birds that have passed through their second laying season, are sold immediately after the breeding season, usually in June. The selling of these hens at this time gives more room on the plant for the growing chicks; it also puts on to the market poultry flesh when it is comparatively scarce and consequently high in price, and indirectly it assists the market later on in the summer and fall when, as a rule, poultry meat of all kinds is marketed.

EXPERIMENTS.

The nature of the experiments conducted have already been referred to. There is not yet sufficient equipment to carry on considerable investigational work that is desirable, and attention is being paid especially to experiments of a practical nature which directly affect the producer. Some of these are reported on from year to year, others will take several years before there will be sufficint reliable data upon which to report.

One of the main experiments is the development of strains that will produce more eggs during the year and a larger proportion of eggs when eggs are dear.

This experiment, however, can be conducted only with a few varieties, as the detail which is necessary makes it impossible to spread the efforts over much ground. When it is taken into consideration that in this work it is necessary to keep track of every egg which each hen lays, to know how many of these eggs are fertile during the breeding season, at what stage the germ dies if it fails to hatch, how many hatch, followed by an accurate record of each chick, not only through its own life but through future generations, the detail of the work may be appreciated.

Because of the tremendous amount of detail in connection with this one experiment, efforts are being confined to two or three of the most popular varieties, and this year a number of cockerels from the best layers at the Central Farm were sent to the branch Farms. This system will be carried out from year to year, until all the male birds used at the branch Farms are supplied from the Central Farm, and are the product of the best laying strains.

In housing experiments it is interesting to note that the one type of house which has given such good results at Ottawa for years is really the house that can be recommended for practically every province in the Dominion.

BULLETINS.

During the year eight Exhibition Circulars have been published. No. 1 "Natural Incubation," by F. C. Elford, treats of the relative advantage of natural and artificial incubation, the need of system, how to set the hen, how to make the nest, how to keep things clean and free from mites. No. 2 "Artificial Incubation," by F. C. Elford.

This explains how to tell a good machine, the size to buy, where to place the incubator, how to operate it, why good breeding stock is necessary, and a number of things worth remembering. No. 6, "The Farmer's Poultry House," by F. C. Elford; this gives plans of a suitable colony house for twenty or twenty-five hens, and for a stationary house to hold 100 hens, divided into two pens. Besides this it gives some general instruction on building the permanent and movable houses, how to keep things clean, how to ventilate, what floor space is required, best building material, etc. No. 12, "The Farm Flock," by George Robertson, describes what an ideal farm flock should be, who should manage the flock, the kind to keep, how to get a start, proper feeding and marketing. No. 13, "Brooding and Rearing of Chicks," by George Robertson; this treats of both natural and artificial brooding, and gives plans for small brood coops, feed hoppers, etc. It gives pointers on both methods, and definite but concise information on how to feed young chicks to get the best results. No. 29, "Duck Raising," by Victor Fortier. This gives general information in reference to the rearing of ducks, points out the advantages of duck raising, the best breeds, the laying and incubation, the care of the ducklings, and especially the feed, how to fatten for markets, and a few notes in connection with duck diseases. No. 30, "Management of Turkeys," by Victor Fortier, treats in a concise form on turkeys in general, with pointers on the breeding birds, the laying and the incubation, the rearing, feeding, parasites, etc. No. 31, "The Management of Geese," by Victor Fortier, gives a cut of a suitable goose house, mentions the most popular breeds, the care and feeding of the breeding stock, eggs and incubation, rearing fattening, how to distinguish the sexes and a few hints on diseases.

These circulars have also been revised and in addition, there have been prepared two circulars of the same series, by F. A. Elford, one, "The use of Trap-Nests," the other, "Wild Buckwheat for feeding poultry and crate feeding." These though not yet received from the Printing Bureau, will be ready within a few days.

Other bulletins which are in process of preparation are "Caponizing," "Rabbits," and "Pigeons," by Victor Fortier, and "Poultry Diseases," "Poultry Feeds and Feeding," by George Robertson. These will be ready for publication in the near future.

MEETINGS.

During the year the demand for speaking at meetings had been if anything greater than usual. Mr. Fortier has been absent 111 days during the year, and has lectured at sixty-one different places and judged at eighteen shows throughout Quebec and Ontario, and the fact that he did not get to more meetings was because of his inability to leave the office. Mr. Elford attended a number of meetings, but his work here and in connection with the branch Farms have made it impossible to attend very many of these meetings. He made two visits to the branch Farms and Experimental Stations inspecting the poultry work, and a number of "Patriotic and Production" meetings were attended by him during the campaign.

CORRESPONDENCE.

The correspondence of the division is still very heavy. Information in circular form assists considerably, but the number of questions that have to be answered individually seems to be growing. So many people apparently are taking an interest in poultry work and they want a reply to their own letters dealing with their own individual case, and in so many instances the reply must be carefully prepared.

VISITORS.

The visitors to this division are increasing every year and require considerable attention from members of the staff. They are at all times received cordially, and the very best of attention is given to them. The majority of the visitors apparently do not come because of curiosity but from an earnest desire to gain information on poultry subjects.

The arrangement of the plant at present and the old buildings make it very inconvenient for proper inspection by visitors. The plans, however, for the new arrangement which can be put into execution when the administration building is built, are prepared, and when completed visitors will be able to go through the plant and see every detail with little inconvenience.

Bee Division.

At the separation of the Division of Entomology from the Experimental Farms Branch, April 1, 1914, Mr. F. W. L. Sladen, former Assistant Entomologist for Apiculture, was left in charge of the apicultural work of the Dominion Experimental Farms, and became the apiarist.

At the Central Experimental Farm the experiment of wintering bees out-of-doors in cases packed with shavings, four hives to the case, having proved fairly successful in 1912-13, was continued in the winter of 1913-14 and 1914-15 in a portion of the apiary protected from wind by a high board fence, with the result in both winters that the bees wintered out-of-doors were, on the average, stronger in the spring than those wintered in the bee-cellar under the Farm foreman's house.

The appointment of Geo. F. Kingsmill, B.S.A., as assistant to the apiarist for a term of six months from June 29 to December 29 gave an impetus to the work of the division. It enabled the apiarist to make a tour of the principal branch Experimental Farms, and inspect the apiaries there, to study the conditions for bee-keeping in the regions served by these Farms, and to visit prominent bee-keepers. The western Farms were visited between July 27 and August 11. Bees were found on thirteen of the branch Farms, as follows: Brandon, Man., thirty colonies; Indian Head, Sask., one colony; Lethbridge, Alta., two colonies; Invermere, B.C., three colonies; Sidney, B.C., fourteen colonies; Agassiz, B.C., nine colonies; Lacombe, Alta., three colonies; Cap Rouge, Que., twenty colonies; Ste. Anne de la Pocatière, Que., fifty-one colonies; Nappan, N.S., eight colonies; Kentville, N.S., eight colonies; Charlottetown, P.E.I., nine colonies; and Fredericton, N.B., seven colonies. At Sidney, B.C., Agassiz, B.C., Kentville, N.S., Charlottetown, P.E.I., Fredericton, N.B., Cap Rouge, Que., and Ste. Anne de la Pocatière, Que., the bees were storing or had stored considerable quan-

tities of honey, principally from clover. At Nappan, N.S., usually a good place for honey, adverse weather conditions for ingathering following severe winter-killing of alsike and white clover had prevented a crop, and had reduced some of the colonies to the verge of starvation. There was plenty of evidence that bees could be kept, in most cases with good profit, at all the branch Farms and Stations visited.

Undoubtedly the chief hindrance to greater profit in the apiaries on the branch Farms is excessive swarming. At most of the Farms the possible honey yield had evidently been cut in half or less by swarming. At Agassiz, unusually strong measures had been taken to prevent swarming, but without success, several swarms having been lost.

Attempts begun by the apiarist in 1913 to breed bees by selection for the improvement or fixation of desirable characters were pushed a stage further in 1914. A bee-mating station that he had chosen on the Kazubazua Plains, Quebec, about 40 miles north of Ottawa, was again employed, and a number of queens bred from a non-swarming colony of Italians found in the apiary at the Central Experimental Farm were mated there in September and October with drones from the same colony. These bee-breeding experiments are to be continued in 1915, and it is hoped by their means to discover whether it is practicable to breed Italian bees by selection, and if so whether the disinclination to swarm, noticeable in certain colonies, is inherited. Should it be found that this character is inherited it is hoped that it may be possible to produce a variety of bee that swarms but little, so that bee-keepers may be saved the great amount of labour and loss incidental to swarming.

An attempt to investigate and improve by selective breeding the quality possessed by Italian bees, some more than others, of resistance to European foul brood, a very destructive, persistent and rapidly-spreading disease of bees, is also being made.

The bees at the Central Experimental Farm are being transferred from the old hives of various sizes and patterns to new 10-frame Longstroth hives of uniform type, thus enabling comparative tests of colonies to be better and more easily made than formerly.

Tobacco Division.

The season of 1914-15 was very unfavourable for tobacco plantations, in Quebec as well as in Ontario.

The spring of 1914 was exceptionally warm, but the mean temperature of the summer was continually below the average, and the nights were always cool. Furthermore, the beginning of the month of June was characterized by a drought such as has very seldom been experienced. The fields of tobacco had great difficulty in taking root, and in many cases the farmers were compelled to reduce the area in tobacco.

This year, as in the past, the experimental field of the Central Experimental Farm was used for seed production and tests of varieties. A special selection was made of smoking tobaccos generally used in Canada. Among the newly tried varieties, the "Maryland" and "Feuille d'Or" gave particularly good results.

The tobacco crop at the Station of St. Jacques l'Achigan, Que., was particularly affected by the unfavourable climatic conditions. The yields in weight were poor, the

plants gave a short leaf and a little too thick. However, it was possible to make a number of selections in the varieties Yamaska and Big Ohio Sumatra. The seeds ripened well and the best types will be tried in 1915.

The Station of Farnham, Que., is being rapidly improved. The drained area has been increased by about 10 acres. A kiln has been built for the purpose of experimenting, under Quebec conditions, with the flue-curing process, as used in Virginia and Carolina. The results obtained in 1915 cannot be said to be satisfactory, but it is hoped that they will be improved, when operating under better conditions and with varieties of tobacco grown on the Station and better adapted to this method of drying. The tobacco treated in 1914 had been produced in the neighbourhood of the Station.

In spite of the difficulties met with at the beginning of the season, the crop of the Farnham Station had a very good appearance, when it was damaged, on the 19th August by a hail storm which greatly lowered the quality of the products, particularly of those which were to be used as binders. This is all the more unfortunate because it prevented us from recording reliable data as to the relative value of the new binder types grown at the Station.

The Station of Harrow, Ont., gave almost a normal crop of Burley. As to the Virginian tobacco, which is treated by the flue-curing process, the proportion of really yellow leaves was not as large as during the last few years. It seems to be very difficult to secure bright yellow tobacco on the land of the Station when the season is not particularly favourable.

An interesting programme of experiments of a semi-technical and semi-practical nature, covering all phases of the growing of tobacco, is now in progress at the Stations of Farnham and Harrow. Interesting results have been obtained at the end of the first season, especially as regards the chemical fertilizers.

Harvesting and curing methods have been improved with a view to lower the cost, to secure cleaner products and reduce the period of curing. Appreciable results have been obtained.

At the beginning of the season, two inspectors were added to the Tobacco Division, one for Ontario and one for Quebec. The first came from Kentucky, and the other from France, where he was attached to the staff of the Tobacco Administration. These inspectors have enabled the Tobacco Division to get into closer touch with the growing centres already established, and to ascertain the possibilities in new centres.

Over 4,000 samples of tobacco seed were distributed during the winter. There seems to be a tendency in Quebec, especially in the North Shore districts, to substitute the growing of smoking tobacco to the growing of binder tobacco. This movement is increasing from year to year.

Experimental Station, Charlottetown, P.E.I.

The season of 1914 was a favourable one in Prince Edward Island, the crops equalling those of the banner year of 1910. Grain was late in maturing, but ripened well, and the harvesting weather of September was excellent.

In addition to the work in horticulture and with field crops, experimental feeding of steers and lambs was successfully carried on. Two poultry houses were put up during the year.

Experimental Station, Fredericton, N.B.

The winter of 1913-14 was a very cold one, and the spring backward, the weather being cool until the end of July. Growth was consequently slow until August, but warm weather during that month and in September resulted in good crops being harvested in excellent condition.

During the year, the dairy barn, dairy, and horse stable were completed, some poultry buildings were put up, and a double cottage erected. A small area was purchased to round out the Station holdings. Some experimental work was carried on, especially in testing fertilizers with potatoes, but most of the field work was of a preparatory nature, consisting of clearing, breaking, draining, and fencing.

A dairy herd has been placed at this Station, and some experimental feeding of beef cattle carried on.

Experimental Farm, Nappan, N.S.

In spite of a somewhat backward spring, the season of 1914 was productive of good crops of grain, forage, and roots, harvested in good condition.

The Farm buildings were wired for electric lighting during the past winter.

Experimental work in all the various lines was carried on, as in previous years.

Experimental Station, Kentville, N.S.

Work with cereals, horticulture, forage crops, animal husbandry, poultry raising, and bee-keeping was carried on at this comparatively new Station, and further clearing and breaking was done. The demonstration orchard work was continued in the Annapolis valley, and valuable results obtained.

Work on the land commenced on May 16. The season was, on the whole, favourable to all field crops.

Experimental Station, Ste. Anne de la Pocatière.

A pure-bred and a grade herd of dairy cattle were placed at this Station. Fruit plantations were sent out and considerable experimental work done. Most of the season, however, was devoted to draining, fencing, and stoning the fields. The farm buildings erected have proven satisfactory. An apiary has been established, and good returns obtained.

Seeding commenced on May 9, and growth was good until the latter part of June, when a drought commenced which lasted throughout July and the greater part of August. As a result, yields were much below the average.

Experimental Station, Cap Rouge, Que.

The season at this Station was marked by scanty precipitation up to the middle of August, which lessened crop yields, but abundant rains later made the harvest a

fair one. Experimental work in all lines was carried on. A large amount of draining was done. The road in front of the Station was macadamized and a water system put in. A poultry administration building was put up.

Experimental Station, Lennoxville, Que.

The work at this new Station was preparatory in nature. A large amount of fencing and draining was accomplished, and some repairs made to the old buildings already on the property when purchased, to fit them for temporary use. No new buildings were erected here during the year.

A feeding experiment with steers and another one with lambs have been carried on with satisfactory results.

Experimental Farm, Brandon, Man.

Seeding was somewhat later than usual, owing to a backward spring, but warm weather and abundant moisture caused excellent growth up to the beginning of July. Thereafter, the weather was hot and dry, with high winds. Grain crops ripened too rapidly, and the yield was lessened from one-fourth to one-third.

Work was carried on in all branches of agriculture, horticulture, and live stock raising, and dairying.

Experimental Station, Morden, Man.

An area for an Experimental Station at this point in southern Manitoba was purchased just at the close of the fiscal year. It is the intention to make horticulture a main feature of the work at that point.

Experimental Farm, Indian Head, Sask.

Extreme heat and drought caused a premature ripening of cereal crops, and wheat was damaged by frost on August 9. The yield of wheat was fairly good, however, considering the dry weather. Oats, barley, potatoes, corn, and roots were a light crop.

Extensive feeding tests with steers and lambs were carried on.

Experimental Station, Rosthern, Sask.

Spring opened later than usual, seeding beginning on April 23. Growth was good until early in July, when a prolonged drought lowered yields of all grain crops. An additional area was purchased at this Station which will permit of a considerable extension of the work carried on. A cottage for the foreman was built during the summer.

Experimental Station, Scott, Sask.

Seeding commenced on April 15. The season was the driest recorded in the district. What rain fell came in light showers, which were soon dried up by the hot winds. These conditions seriously reduced yields of all field crops.

During the year a half-section of land was added to the Station, making its present area 518½ acres, and considerable fencing was done on this new area. A cottage for the foreman was built.

EXPERIMENTAL STATION, LETHBRIDGE, ALTA.

The drought of 1914, taking area affected and intensity into consideration, was the most severe since the settlement of southern Alberta. The soil was fairly moist when seeding commenced, but the rainfall during April, May, and early June was extremely light. July was so dry and hot that the failure of grain crops was general, with the exception of those on summer-fallow.

Alfalfa on irrigated land gave heavy yields, and irrigated grain crops did fairly well. Some damage was done by cutworms.

Feeding experiments with steers and lambs were carried on successfully.

EXPERIMENTAL STATION, LACOMBE, ALTA.

Seeding commenced on April 13, under favourable conditions. May was a dry month, but abundant rains in June and a warm July made growth rapid, and an excellent harvest was obtained.

An office building was erected, some improvements made to other buildings, and considerable fencing done.

Work with dairy cattle, beef cattle, swine, and poultry was continued during the year, with excellent results.

EXPERIMENTAL STATION, SUMMERLAND, B.C.

This Station was established in the autumn of 1914, and is an area purchased from the Indians of the Penticton reserve. A large amount of work has been done during the winter and early spring in clearing and levelling, ready for irrigation, and all preparations have been made for laying a pipeline from Trout creek to the Station lands, for this purpose.

EXPERIMENTAL FARM, AGASSIZ, B.C.

Seeding commenced on April 18. The season on the whole was a very dry one. From June 27 until harvest there was practically no rain. Fairly good crops were obtained, however.

Extensive experimental work was carried on with the dairy herds and in dairying, also in swine feeding. Work with poultry is a feature at this Farm. A considerable area was cleared for crop, a herdsman's cottage was built, and a small addition made to the dairy building to provide a cheesemaking room.

EXPERIMENTAL STATION, INVERMERE, B.C.

The work here was mainly preparatory, although considerable experimental work in horticulture was also accomplished.

The Station land was cultivated and levelled, ready for laying out rotations and carrying on tests in irrigation and dry-farming. Fruit and ornamental trees were set out, and a beginning made with poultry work. Two poultry houses were built, also a root cellar with incubator room above, and an implement shed.

EXPERIMENTAL STATION, SIDNEY, B.C.

The work at this new Station consisted mainly in the continuation of operations in clearing, draining, grading, ploughing, setting out orchards and plantations, fencing,

etc. No farm buildings have yet been erected at this Station. General farm work has been possible during most of the winter.

Substations.

A limited amount of experimental work was carried on at Forts Vermilion, Smith, Resolution, and Providence, Grouard and Grande Prairie, in Alberta. At Salmon Arm, B.C., Mr. Thos. A. Sharpe continued his work in horticulture, for the department.

At Fort Vermilion, the most important of the Alberta substations, the results were, as usual, excellent in practically all crops grown.

FIELD CROPS OF THE DOMINION.

The growing season of 1914 was marked by prolonged periods of drought in most sections of the Dominion with the exception of the Maritime Provinces, where growing conditions were favourable, and crops good. The drought came at a time to be especially unfavourable to the growth of grain, the average yields per acre throughout Canada being considerably below those of 1913.

Potatoes gave higher yields this year, as did also turnips, fodder corn, and sugar beets. Hay, clover, and alfalfa gave somewhat lower average returns in 1914.

The following tables, compiled from the Census and Statistics Monthly, give the estimated areas, yields, and values of the principal field crops of Canada for the years 1913 and 1914.

Areas and Estimates of Yield and Value of Field Crops, 1914.

Crop.	Area.	Yield per acre.	Total Yield.	Weight per bushel.	Average price.	Total value.
	Acres.	Bush.	Bush.	Lb.	$ cts.	$
Fall wheat	973,300	21·41	20,837,000	59·61	1·05	21,818,000
Spring "	9,320,600	15·07	140,443,000	59·16	1·24	174,600,000
All "	10,293,900	15·67	161,286,000	59·49	1·22	196,418,000
Oats	10,061,500	31·12	313,078,000	36·31	0·48	151,811,000
Barley	1,495,600	24·21	36,201,000	47·22	0·60	21,557,000
Rye	111,280	18·12	2,016,800	55·47	0·83	1,679,300
Peas	205,550	17·64	3,362,500	60·53	1·46	4,895,000
Buckwheat	354,400	24·34	8,626,000	48·20	0·72	6,213,000
Mixed grains	463,300	35·36	16,382,500	45·51		10,759,400
Flax	1,084,000	6·62	7,175,200	52·49		7,468,000
Beans	43,830	18·20	797,500	60·21		1,844,300
Corn for husking	256,000	54·39	13,924,000	56·62		9,808,000
Potatoes	475,900	180·02	85,672,000			41,598,000
Turnips, etc	175,000	394·30	69,003,000			18,934,000
		Tons.	Tons.			
Hay and clover	7,997,000	1·28	10,259,000			145,999,000
Fodder corn	317,000	10·25	3,251,480			15,949,700
Sugar beets	12,100	8·98	108,600			651,000
Alfalfa	90,315	2·42	218,360			3,095,600

LIVE STOCK IN THE DOMINION.

The following table gives the numbers of the principal classes of live stock in the Dominion for the years 1910-14, inclusive.

Live Stock.	1910.	1911.	1912.	1913.	1914.
	No.	No.	No.	No.	No.
Canada—					
Horses	2,213,199	2,595,912	2,692,357	2,866,008	2,947,738
Milch cows	2,853,957	2,594,179	2,604,488	2,740,434	2,673,286
Other cattle	4,250,963	3,939,257	3,827,373	3,915,687	3,363,531
Sheep	2,598,470	2,175,302	2,082,381	2,128,531	2,058,045
Swine	2,753,964	3,610,428	3,477,310	3,448,326	3,434,261

HEALTH OF ANIMALS BRANCH.

During the past year, the officers of this branch have been engaged in the task of securing control over and eradicating the various diseases enumerated in the Animal Contagious Diseases Act. To ensure against the introduction of infection from outside sources, a systematic and thorough inspection of all import animals was made; and to prevent the spread of any disease inside our borders, the cleansing and disinfection of live-stock cars and yards was carried out under the supervision of inspectors of the Health of Animals Branch.

Immediately following the discovery of foot-and-mouth disease in the United States, it was necessary to prohibit absolutely the importation therefrom of all domestic animals, their parts and products, as well as all materials that might in any way, by contact, have brought the malady into Canada. The importance, however, of securing horses for the British army made a modification of the restrictions imperative, and, consequently, horses obtained by the British Remount Commission were allowed entry under certain definite conditions. Recently, also, it was deemed advisable to allow the entry of a limited number of horses upon the importer obtaining a permit from the Veterinary Director General.

Foot-and-mouth disease, also, precluded the issuance of permits for the importation of ruminants and swine from the British Isles during the greater part of the year. The British Board of Agriculture, however, succeeded in stamping out the disease, and the department is now in a position to consider favourably the issuing of permits for the importation of cattle, sheep, and swine from any part of Great Britain.

Glanders was well under control duing the year, the unceasing vigilance of the veterinary inspectors preventing the spread of the disease over more than very limited areas. The success that is being met with in dealing with this disease will be readily appreciated when last year's figures are compared with those of former years. The number of 638 horses slaughtered for glanders in 1912-13 was reduced to 353 in 1913-14, and further reduced to 340 in the last fiscal year. To guard against the re-introduction

of infection from other countries, all import horses must be tested either before being shipped, or upon arrival at the boundary.

Dourine, or maladie du coit, is still causing considerable anxiety in Alberta and Saskatchewan. A small outbreak in the province of Quebec was promptly checked. During the year, 390 horses were slaughtered, as compared with 471 the previous year. The improved method of diagnosis by means of a serum test enables Dr. A. Watson, of the Veterinary Research Laboratory at Lethbridge, to definitely determine the presence of this disease in the infected animals, even though they may show no symptoms.

Mange in cattle and horses is being given the most careful attention, especially in Alberta, where a force of range riders is employed to search for infected animals on the open range. In all parts of the Dominion the figures for the year show a marked decrease, the total number of horses found infected being 190, as compared with 300 in 1913-14; 450 horses were quarantined during the year, as against 1,638 the previous year. The efforts to eradicate cattle mange are likewise achieving noteworthy results—1,660 cattle being found diseased out of a total of 30,300 quarantined, a large decrease from the figures of the previous year, when 2,724 animals were found suffering from mange, out of a total of 62,149 quarantined. The disease having been completely eliminated from a large portion of the territory under quarantine restrictions, it was possible to lessen considerably the quarantined area.

Sheep scab.—The strictest precautions are taken to guard against the introduction of this disease into Canada—a thirty-day's quarantine being imposed upon all import sheep except those imported for immediate slaughter. In the province of Manitoba, where 270 diseased sheep were found, occurred the only outbreak during the year.

Hog cholera has been more prevalent during the past year than for several years preceding. On account of the large sums of money involved in compensation, a change was recently made in the regulations, whereby it is hoped to save a certain amount of exposed hogs, which have hitherto been a dead loss; these hogs may now be immunized by the serum method, with a view to converting them into pork. This treatment will be at the hands of veterinary inspectors only, who are so authorized by the Veterinary Director General. During the year about 34,500 hogs were slaughtered—more than 24,500 in excess of the number slaughtered during the year 1913-14.

Rabies was confined to Ontario, British Columbia, and Saskatchewan. In all, 305 animals were quarantined, of which 122 were dogs. Only in the Cowichan district in British Columbia it was necessary to issue a general muzzling order, and this order is still enforced. It is hoped that the energetic measures taken will have the effect of stamping out the trouble at an early date.

Tuberculosis in cattle being transmissible to human beings, it was deemed advisable and in the public interest for the Government to assist those cities and towns endeavouring to ensure a pure and wholesome milk supply for their inhabitants. For this purpose, in June, 1914, a new set of tuberculosis regulations was drafted, whereby the Department of Agriculture, under certain conditions, might give its aid in the

control of bovine tuberculosis in municipal dairy herds. As in former years, the department has dealt with the testing of import and export cattle for breeding purposes, the testing of the cattle in supervised herds, and those exported for breeding purposes to British Columbia. Tuberculin has also been supplied, free of charge, to private practitioners, on condition that they report the results of the test; 3,784 tests were applied by officers of this branch, as compared with 5,050 the previous year, the percentage of reaction being 5⅔ as against 8 per cent in the year 1913-14; 3,250 tests were applied by private practitioners, as compared with 4,750 the previous year, the percentage of reaction being, respectively, 13 and 7 per cent.

Anthrax caused very little trouble throughout the year, although outbreaks in old infected districts of Quebec and Ontario are causing considerable alarm. In Quebec, 470 animals were quarantined, while in Ontario three animals were found diseased out of a total of 185 quarantined.

The system of fox inspection inaugurated during 1913 was carried on during the past year, two fox farms being quarantined for scabies.

Dr. S. Hadwen, the Pathologist at Agassiz, B.C., is carrying on his experimental work in connection with red water, while Dr. A. Watson, at Lethbridge, is engaged in the testing of blood samples from suspected dourine cases.

The pathologists engaged at the Biological Laboratory at Ottawa have carried on their usual work in connection with the reports on specimens, the preparation of vaccines, and experimental work in connection with blackhead in turkeys, strangles, and contagious abortion. During the year it was also necessary to furnish the Militia Department with vaccines. Dr. T. C. Evans succeeded in preparing a vaccine which gives excellent results in the treatment of strangles. This vaccine is now on sale to veterinarians at a cost of 2½ cents per dose.

The demand for blackleg vaccine during the past year has been unprecedented in the history of the branch, while the absence of outbreaks of anthrax has fortunately limited the applications for anthrax vaccine. These vaccines sold at a cost of 5 cents a dose.

The buildings at the new animal quarantine station at Lévis, Que., were recently completed, and are now ready to accommodate oversea importations.

MEAT AND CANNED FOODS DIVISION.

The work carried on by this division shows a greater increase than in any year since its inception.

The records of slaughter indicate that there have been killed in inspected establishments, 533,425 cattle, 2,598,738 hogs, and 447,173 sheep, an increase over the previous year of 748,998 animals.

In order to properly carry out the regulations, a number of new appointments were necessary, yet with these additions to the staff, inspectors have been called upon to perform an unusual amount of work, which demand has been met with commendable willingness.

Owing to the war a very large number of our officers volunteered for active service and, after careful consideration, as many as possible were allowed to go to the front. In order, however, that the work of inspection might be properly supervised and that the freedom from disease and wholesomeness of the somewhat extraordinary shipments of meat and meat food products which were being sent abroad for the use of our troops and foreign customers might be guaranteed, it was essential that the staff should not be further reduced, and in consequence of this it became necessary to refuse later applications for leave. This spirit of loyalty in our inspectors is very much appreciated, but the impossibility of granting all applications for military leave will be at once understood when it is considered that the principal appointees to this service must be graduate veterinarians who have by examination shown that they possess special qualifications for the work.

As a result of the increase in hog production, additional establishments were brought under inspection. While these plants had been in operation for some time, their trade had hitherto been confined to the province in which they were situated, and it is encouraging to note their faith in the future development of the live-stock industry as evidenced by their desire for a greater market.

The increase in the number of hogs was due to the continued extra production in the western provinces.

The standard set by which veal carcasses are adjudged as to their fitness for food is producing splendid results. The class of such carcasses now being presented for inspection shows that they are being well fed and kept for a sufficient length of time to ensure their being a sound and wholesome food. The unwarranted practice previous to 1907 of placing on the market calves of questionable age is almost a thing of the past and has resulted in keeping on the farm for growth and development a large percentage of calves which will augment our future beef supply.

The slaughter of sheep and lambs shows a decrease. The demand for this nourishing and healthy meat food is on the increase, and is evidenced by the exceptionally high prices which have prevailed, and which have no doubt proven remunerative to the producer. It is hoped that there will be an extended development of this class of food animal.

Sanitary conditions in the inspected establishments have been well maintained. Additions and alterations are being continually made with a view to facilitating rapid operations with a maximum degree of cleanliness.

FRUIT AND VEGETABLES.

The past year was very favourable for the growth of fruit and vegetables, which resulted in a very large pack and a consequent reduction in the price to the consumer.

The pack of evaporated apples was somewhat smaller than usual, yet the quality could be said to be rather better than in previous years. This was due in some measure to the enforcement of the standards as to moisture content.

The sanitary conditions of these different plants were, on the whole, satisfactory.

CONDENSED MILK.

The conditions to be found in the milk-condensing establishments are excellent. The pack during the past year was normal, and little difference prevailed in price.

FRUIT BRANCH.

Previous to May 1, 1914, the work of the Fruit Branch had been under the direction and supervision of the Dairy and Cold Storage Commissioner, as the Fruit Division of this branch. The growing importance of the fruit industry necessitated a change; on the date above mentioned the Fruit Branch was created.

The past year, so far as the Fruit Commissioner's own duties were concerned, has been largely one of organization. He has visited all the fruit-producing centres of Canada with which he was not entirely familiar, and has endeavoured to acquaint himself with existing conditions and with the needs of the fruit industry. The information thus obtained will enable the development of the branch to be made along lines which will best serve the interests of the industry.

THE FRUIT SEASON.

The most notable feature of the past season was the almost total failure of the peach crop in Ontario, due to winter injury to the buds in January and February, 1914. A good crop was harvested in British Columbia. Pears and plums were a light crop in Ontario, and a full crop at the Pacific coast. The Niagara grape and cherry crop was an exceptionally heavy one.

For apples, the season was not altogether favourable. Early in the year there was every indication of an excellent crop in all the fruit-producing sections of the country, and as the time for harvesting approached, reports continued to be optimistic. It was particularly noted that the fruit was above average in quality, a result largely brought about by more effective spraying. The outbreak of war in Europe almost completely demoralized the market for the time being. It was impossible for growers to secure space for the ocean transportation of early varieties, and there was no certainty of conditions being more satisfactory when the later varieties were ready for shipment. The result was that much of the crop of early apples went to waste. Growers who had been dependent upon the itinerant apple buyers found themselves confronted with the difficulty of marketing their own fruit, and in many cases were quite unable to meet the situation. Efforts were made to relieve these conditions. The Government gave much assistance by conducting an advertising campaign with the object of increasing home consumption. The sailings of transatlantic steamships became more regular after the departure of the first Canadian contingent. By the time the main bulk of the apple crop was harvested, the markets were more normal and the prices received on Old Country shipments were generally satisfactory. In certain sections of Ontario there was considerable waste, but the consensus of opinion is that the season was quite as favourable as could be expected under existing conditions.

CROP AND MARKET REPORTING.

Careful attention was given to crop and market reporting. A special inquiry was made into the peach situation early in May, and a report issued at the time foretold the failure of that crop in Ontario. A monthly Fruit Crop Report was published in June, July, August, and September, compiled from the reports of many practical growers throughout the country. Later in the season, owing to the uncertain state of the fruit market, there was a demand on the part of the growers to be kept closely in touch with prices and with the general situation in the home and foreign markets. A system of telegraphic reporting was introduced. Cables were received at frequent intervals from the principal markets in Great Britain, and telegrams from all the important Canadian markets, as well as the large producing centres. During October, November, and December these telegraphic reports were condensed and published three times a week in the leading Canadian newspapers, and also sent to any individuals to whom they might be of special value. So successful was this system of reporting that the names of practically all the important growers and dealers were ultimately added to the mailing list. The work of reporting will be carried on along similar lines and on a more extensive scale next season.

FRUIT FOR THE PANAMA PACIFIC EXPOSITION.

During the fall of 1914, 2,000 boxes of Canadian apples were packed for the Panama Pacific Exposition at San Francisco. The exhibit was collected from all the fruit-producing provinces of the Dominion, specially packed and loaded in cars. It arrived at its destination in perfect condition and attracted much attention. These 2,000 boxes are sufficient to keep Canadian fruit on exhibition until the end of the summer, when a further collection will be made.

FOURTH DOMINION FRUIT CONFERENCE.

In spite of the war and the consequent difficulty of holding large representative gatherings, I was pleased to be able to arrange the Fourth Dominion Fruit Conference on September 2, 3, and 4. Forty-five regularly accredited delegates were present, including representatives from the Provincial Departments of Agriculture, the Provincial Fruit Growers' Associations, Agricultural Colleges, Apple Shippers, Associations, and wholesale fruit trade.

A complete report of the proceedings of the conference is now being published for general distribution.

INSPECTION WORK.

The administration of Part IX of the Inspection and Sale Act continues to be an important part of the Fruit Branch. The arrangement made at the beginning of the season 1912-13, whereby the country was divided, for fruit inspection purposes, into five districts, with a chief inspector in charge of each, has proved most satisfactory, and was continued during the past season. A staff of fifty-four men, including the chief inspectors, was employed in the inspection work during the season 1913-14.

The system of inspection followed was the same as in former years, except that in Nova Scotia, where previously practically all the inspection was done at the port of Halifax, the Fruit Commissioner made a trial of inspection at point of shipment, which has been advocated by the growers for some time. Eleven out of the thirteen men employed in this province were stationed at the shipping stations throughout the Annapolis valley, where they were able to inspect the fruit as it was being packed and shipped. The experiment proved most satisfactory, and the fruit men generally throughout Nova Scotia expressed their desire that this system of inspection should be continued. The presence of the inspectors in the warehouses and packing sheds appeared to have a deterrent effect on false grading and packing, and only twelve convictions for violation of the law were recorded in Nova Scotia this season, as against thirty in 1913-14.

It is gratifying to be able to state that the convictions under Part IX of the Inspection and Sale Act were only seventy-eight for the whole Dominion during the past season, as compared with 105 in 1913-14. Of the seventy-eight, fifteen convictions were secured with respect to imported fruit which was not marked in accordance with our Canadian law. The decrease in the number of violations of the Act is no doubt partly due to the fact that the 1914 crop was large and of splendid quality generally, but credit must also be given to great improvement which is noticeable in the commercial pack.

APPLE PACKING DEMONSTRATIONS.

During the past winter, in addition to their other duties, the fruit inspectors gave instruction and demonstrations in the modern methods of packing fruit. In British Columbia this work was done in co-operation with the Provincial Department of Agriculture at their packing schools. In Ontario, Nova Scotia, New Brunswick, and Quebec, practical demonstrations were given in packing houses, extending in some cases over several days. These meetings have been very popular and have already resulted in much improvement, particularly in the apple pack of Eastern Canada.

ENTOMOLOGICAL BRANCH.

At the beginning of the year the Entomological service of the department was separated from the Experimental Farms Branch and organized as a separate branch under the direction of the Dominion Entomologist, Dr. C. Gordon Hewitt. The work of the branch comprises the administration of the insect and pests section of the Destructive Insect and Pest Act; the suppression of the Brown-tail Moth and the introduction of its parasitic and predaceous insect enemies, and those of the Gypsy-moth into New Brunswick and Nova Scotia; the carrying on of investigations upon insects affecting farm, garden, and orchard crops, forest and shade trees, live stock, household and public health, mills and stored products, and the answering of inquiries and the giving of advice concerning the control of such insects; the naming of collections of insects for institutions and individuals, and the administration of an appropriation of the Department of Indian Affairs for the care of the orchards on the Indian reservations in British Columbia.

Under the Destructive Insect and Pest Act, nursery stock organization in countries in which the San José Scale occurs was fumigated at our various fumigation stations. The erection of the new station at Montrose (Niagara Falls, Ont.) for the fumigation and inspection of imported nursery stock was completed in time to permit its opening at the beginning of the year, and the first season's experience has amply demonstrated the value and economy of this addition to our plant quarantine system. Nearly five million imported trees and plants originating in Europe, Japan, and the New England States were inspected during the importation season of 1913-14 for Gypsy and Brown-tail Moth and other insect pests.

As a result of the enormous flight of the Brown-tail Moth from the New England States into the provinces of New Brunswick and Nova Scotia in July, 1913, the infested area in each of these provinces was materially increased, and the number of winter webs collected was many times greater than in previous years. The total infested area in the two provinces was found to be over 13,500 square miles, as compared with about 9,000 square miles in the previous year. I am pleased to acknowledge the continued co-operation of the Provincial Governments who employ half the number of men engaged under the direction of my officers in the collection of the winter webs of the Brown-tail Moth.

Through the continued courtesy and co-operation of the United States Department of Agriculture it has been possible to continue our work of collecting parasitized Gypsy and Brown-tail Moth caterpillars in Massachusetts, where they have been established, having originally been introduced from Europe and Asia, and to breed out the parasites at the Gypsy-moth Laboratory, Melrose Highlands, Mass. These parasites, and predaceous beetles that were also collected, were shipped to our entomological laboratories at Fredericton, N.B., Bridgetown, N.S., and Covey Hill, Que., the greater proportion being shipped to Fredericton for establishment at strategical points in New Brunswick. One species of parasite is now firmly established in Nova Scotia.

It has now been possible to realize the advantages of the policy of establishing field or regional laboratories in different regions of the Dominion for the study of serious insect pests. The presence of trained men to assist the agriculturists in regions where outbreaks of insect pests have occurred, has on several occasions been the means of preventing more serious losses, and the educational work my field officers are carrying on is proving to be a valuable form of assistance. Their close and constant contact with the farmers and fruit growers is proving to be of the greatest benefit. A new laboratory was established in Stanley Park, Vancouver, B.C., during the year, making the number of these laboratories nine. The following is a list of the entomological field laboratories, showing the investigations that are being carried on by my officers who are in charge:—

Bridgetown, N.S.—Investigations on the Brown-tail Moth, the introduction of its parasites and control work. The control of Bud Moth and Green Fruit-worms of apple.

Fredericton, N.B.—Control work and investigations on the Brown-tail Moth and the introduction and establishment of its parasitic and predaceous

enemies; parasitic and natural control of native insects: the Tent Caterpillar, Fall Web-worm and Spruce Budworm.

Covey Hill, Que.—Apple insects, particularly Apple Curculio; control of locusts by bacterial disease.

Vineland Station, Ont.—Apple Maggot; aphids affecting apple; control of greenhouse, mill-infesting, and miscellaneous insects.

Strathroy, Ont.—Investigation of white grubs, wireworms and insects affecting field crops; Army-worm control.

Treesbank, Man.—Insects affecting cereal crops: Hessian Fly, Wheat-stem Saw-fly and Wheat-stem Maggot, and locusts; white grubs.

Lethbridge, Alta.—Cutworms and Nematodes ("eelworms") affecting cereal and other crops.

Agassiz, B.C.—Root Maggots; Wheat Midge; and insects affecting fruit, particularly the Bud-moth of Apple.

Vancouver, B.C.—Primarily the investigation of insects destroying coniferous trees in Stanley Park; Bark-beetles, and other forest insects.

Progress has been made in the fruit-insect investigations carried on at the different laboratories. In Nova Scotia, our experiments on the control of the Bud-moth have disclosed a spraying system that is now being demonstrated to the fruit growers. The discovery of the alternate host of the Apple Aphis by one of my officers is of importance.

During the summer of 1914, a severe outbreak of the Army-worm was experienced in Eastern Canada, particularly in Ontario, where the loss of the farmers was very great. A much greater loss was prevented by the prompt action of our local field officer and the representatives of the Provincial Department of Agriculture. A thorough study of the insect was made. Further work was carried on in regard to the control of locusts, both by bacterial disease and poisoned baits. The success that followed the experimental and demonstration work with the poisoned bran made according to the Kansas formula is very encouraging in view of the serious losses that have been caused by locusts in Eastern Canada during the last few years. The study of the Nematode worms, popularly known as "eelworms," affecting cereals has been continued in Alberta in the hope that it may throw some light on certain obscure troubles affecting wheat in that region. In the same region the investigation on the control of cutworms affecting cereals has been continued. Continued and satisfactory progress is being made in the White Grub investigation that is being carried out in Ontario and Manitoba. Experimental work on the control of root maggots has been continued at Ottawa, Ont., and at Agassiz, B.C.

The work on insects affecting forest and shade trees has been continued along the same lines as last year. Special attention has been paid to investigations of the injuries caused in our forests, particularly those in British Columbia, where a large amount of valuable merchantable timber is being destroyed by bark-beetles. The methods of control must be based upon a study of the life-histories and habits of the various species. The situation of the lumbering industry in British Columbia unfortunately prevented the undertaking of control measures that we had planned with a view to checking certain serious outbreaks of bark-beetles that are causing

heavy losses. Owing to the widespread destruction caused by certain species of insects on spruce and hemlock in Stanley Park, Vancouver, B.C., an investigation was undertaken of the insects responsible for the damage. In the eastern provinces the most serious injuries have been caused by the Larch Saw-fly, the Spruce Budworm, the Forest Tent Caterpillar and certain Bark-beetles and larger Wood Borers. The first of these is continuing to spread westward, and has killed much timber. The outbreak of the Tent Caterpillars in Eastern Canada is now on the decline; a study of its natural control and that of the Spruce Budworm is being carried on.

During the year the Dominion Entomologist visited those sections in Eastern Canada in which investigations were being conducted, and has given addresses before agricultural and other meetings on the different aspects of insect control, in which educational work the other officers of the branch have taken an active share.

BRANCH OF THE CANADIAN COMMISSIONER OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

The International Institute of Agriculture continued unabated its activity during the year 1914-15 despite the fact that the great war in progress for eight months of that year involved so many of the adhering countries. The Permanent Committee of the Institute continued its meetings as usual, attended by the delegates of nearly all the nations. At the meeting held on March 17, 1915, there were present the representatives of Great Britain and Ireland and the British Dominions, France, Germany, Belgium, Austria, Serbia, and Japan, together with those of most of the neutral countries. The personal relations between the delegates are reported to have been cordial and satisfactory. At the meeting on October 31, 1914, the president, Marquis Cappelli, referred in dignified language to his grief "at the catastrophe which has befallen Europe; the difficult and noble mission the Institute had to perform in assisting the States to repair the immense losses produced by the war when ended."

The president stated that from various sides and several Governments he had received "hearty encouragement to continue the work, and was grateful to them and all the delegates, especially those of the belligerent countries, for returning to resume their work of peace and progress while the cannon is still roaring; a most hopeful sign of our civilization; an affirmation of human solidarity in spite of the terrible events which seems to deny it."

At the meeting of the Permanent Committee of the Institute in March, 1914, much attention was given to carrying out the resolutions passed by the General Assembly of 1913, and to making preparations for the next General Assembly which was then expected to meet in May, 1915. It was announced that the Institute had communicated with the different Governments with a view to establishing a system under which it would be possible to publish the crop reports at an earlier day in each month than at present.

It was decided by the committee that arrangements should be made for the periodical publication of the rates of freight for agricultural produce between the chief exporting and importing ports. In connection with this question it was

announced at the meeting of the committee in October, 1914, that the Senate and House of Representatives of the United States had passed a joint resolution instructing their delegate to request the Permanent Committee to take steps to call together an international conference to consider the advisability of drawing up a convention for the establishment of an International Commerce Commission, having consultative, deliberative, and advisory powers regarding ocean trade and ocean freights, with the object of giving greater stability to the prices of agricultural produce throughout the world. At a later meeting it was decided that this proposal should form part of the programme of the next session of the General Assembly.

At the spring meeting it was decided to submit to the next General Assembly proposals for the publication of statistics of the production and consumption of milk and the trade in butter and cheese. It was also decided to publish in the "Bulletin of Agricultural and Commercial Statistics" information relating to the area and outturn of the hop crop. Since the production of hops varies considerably, it is of importance to hop growers to be in possession of reliable information concerning the crops of other countries, and the regular publication by the Institute of official data regarding the crop should tend to minimize the violent fluctuations in price which at present occur. The production of hops has considerable influence on the price of beer, and therefore on that of barley.

At a meeting of the Permanent Committee in December, 1914, the principal business was the consideration of certain proposals brought forward by the delegate for France in connection with a report which had been presented at the previous meeting by the delegate for Great Britain and Ireland on the Third International Congress of Tropical Agriculture. In that report the British delegate suggested that steps should be taken to bring to the notice of tropical countries the work done by the Institute in the interests of tropical agriculture. After discussion, the committee resolved that the Institute would address all countries, both those which have adhered and those which have not, pointing out that the Institute is bound to devote its attention to all questions relating to agriculture throughout the world, and describing the services already rendered by the Institute to colonial and tropical agriculture. It was further resolved that the Institute should put itself into communication with the International Association of Colonial and Tropical Agriculture with a view to aiding in carrying out the resolutions passed by the International Congresses. The staff of the Institute was instructed to study still more thoroughly than hitherto, questions connected with colonial and tropical agriculture.

During the year the Institute has continued as usual the publication of its three monthly bulletins: "The Bulletin of Agricultural Intelligence and Plant Diseases," "The Bulletin of Economic and Social Intelligence," and "The Bulletin of Agricultural and Commercial Statistics." There has been some delay in the issue of the English editions on account of a scarcity of translators, some of them having gone to serve their respective countries at the front. There have also been delays, of course, in the transmission of the bulletins from Rome to the Canadian office.

The second International Year Book of Agricultural Statistics was issued in December, 1914. It is much more comprehensive than the first Year Book. It con-

tains the statistics of the area and production of the principal crops, the numbers of live stock, the imports, exports, consumption, and prices of the principal agricultural products in the different countries during ten years up to and including the crops of 1912 in the Northern hemisphere and of 1912-13 in the Southern hemisphere. Unlike the previous Year Book the present one includes the statistics for countries not yet adhering to the Institute.

The Institute also issued during the year the International Year Book of Agricultural Legislation containing the important laws relating to agriculture passed by the different countries in the year 1913.

The Canadian office is charged with furnishing to the Institute the information required concerning Canada, and with republishing in Canada the information contained in the official bulletins, together with other information of a technical character derived from other foreign sources. This republication is done through the monthly "Bulletin of Foreign Agricultural Intelligence," the distribution of which has increased during the past year from 9,500 to 12,600.

The office has dealt with many inquiries on the part of Canadian agriculturists desiring more ample information than is contained in the summaries published. This service is made possible through a system of exchange of publications with various foreign Governments by reason of which the most important bulletins, reports, and books are collected and systematically catalogued in the library.

This library has recently, and especially during the past year, made marked progress. The various sets of dictionary-catalogue cards, numbering in all about 135,000, have now been classified and completed to date. These comprise: (1) a complete dictionary-catalogue set of cards for the publications of the United States Department of Agriculture up to date, and numbering about 19,000; (2) a complete dictionary-catalogue set of cards on agriculture comprising: (*a*) Cards for copyrighted books received by the Library of Congress since 1898; (*b*) cards for accessories by purchase, gift, or exchange, which have come to the Library of Congress since 1901, and to the Library of the Department of Agriculture since 1902; (*c*) cards for re-catalogued books on entomology; (*d*) cards for other books on agriculture, numbering in all about 64,000. Also cards in continuation of these sets to date.

In addition to these two sets the library has a set of cards representing the publications of the United States Agricultural Experimental Stations, numbering about 35,000; cards prepared and typed in the library representing publications received either by exchange, gift, or purchase, numbering about 16,000.

With such facilities at hand, bibliographies can be easily prepared. A number of these have been compiled during the past year, and have been acknowledged to be very valuable by the expert officials of this and other departments desiring technical information. These officials at the same time availed themselves of the considerable collection of agricultural literature on the library shelves, now numbering in books 2,026 and in unbound books and pamphlets 16,959. This collection, although comprising the most important publications from other foreign sources, includes a particularly comprehensive set of the United States agricultural literature issued by state as well as federal institutions, and by the leading colleges, universities, etc.

An effort was made to catalogue the important publications in the various branches of the Canadian Department of Agriculture. Sixteen out of eighteen divisions responded favourably, and their respective publications are catalogued by author, subject, and title, as well as the location of each. Some investigators have taken advantage of these cards, which readily reveal the existence and availability of important books which may be consulted or purchased for permanent use, and the work if continued systematically ought to be generally valuable.

Foreign exchanges were received regularly with the exception of publications from Germany, Austria, France, and Belgium. All the publications received are arranged strictly by subject according to the extended Dewey system of classification. United States official publications are an exception, being kept by themselves.

THE PUBLICATIONS BRANCH.

To edit and publish *The Agricultural Gazette of Canada* and to distribute the publications of the department are the chief duties of the Publications Branch. In addition, the branch prepares and issues to the news and agricultural papers, articles and notices designed to encourage the adoption of improved methods and generally to further the interests of agriculture.

The first volume of *The Agricultural Gazette* was completed with the December number for 1914. Since then three numbers of the second volume have been issued. For much of the success that has attended the effort to bring together and publish facts relating to the activities and progress of organized agriculture in Canada, due credit must be given officials of the Provincial Departments of Agriculture and representatives of other agricultural organizations, whose co-operation has been freely extended from the first. The distribution of *The Gazette* that was, during 1914, confind largely to Dominion and Provincial legislators, the press, libraries and agricultural officials, has been extended to educational officials, including school inspectors and rural science teachers.

During the year there were sent to those on the respective mailing lists, and in response to individual requests, sixty-seven new publications of this department, and small editions of six bulletins issued by the International Agricultural Institute at Rome. The departmental publications included nine reports, thirteen bulletins, nine pamphlets, nine circulars, and three leaflets, besides twelve numbers of *The Agricultural Gazette,* eleven numbers of the Bulletin of Foreign Intelligence and the Agricultural War-Book.

The pieces of literature mailed exceeded in number those of the previous year by more than 700,000 copies, and made a total of 1,806,454. To the addresses on the mailing lists there were sent 153,680 copies of reports, 49,800 copies of *The Agricultural Gazette,* 605,870 copies of bulletins, and 414,858 copies of circulars and leaflets. To personal applicants, there were mailed 26,805 copies of reports, 150,865 copies of bulletins, and 213,332 copies of pamphlets and circulars. To branch Experimental Farms and Stations and other outside government offices there were forwarded to be distributed therefrom, 3,450 copies of reports, 20,530 copies of bulletins, and 151,264 copies of circulars. Of the Agricultural War-Book 16,000 copies were distributed.

In the campaign to encourage a greater production of crops, the Publications Branch did a share of the work. Besides preparing a portion of the material for the Agricultural War-Book, this branch looked after the distribution of this book, as already stated. It also got out new editions and reprints of certain bulletins to meet the demand created by the "Patriotism and Production" conferences and the campaign of agricultural advertising that was carried on.

The addressing of envelopes for the mailing lists is done by machinery, while publications sent out on request have to be addressed by hand. At the end of the fiscal year, for the several mailing lists, there were in use 202,000 embossed stencils. During the year 22,000 stencils were made, each representing a new name added, while 11,000 addresses were changed. During this period, 7,000 names were removed from the lists. These latter were of persons who had died, moved to unknown addresses, or for other causes failed to receive the publications from the post office. The number of envelopes addressed from stencils was 851,500. In some of these, two or more publications were mailed.

As a means of advertising publications, a press notice of each new bulletin and report issued was printed on a multigraph machine and sent out to upwards of 800 papers. It was from this source that most of the personal applications were received. The generous co-operation of the press in connection with this work is acknowledged. In addition, from time to time, there were sent out articles teaching useful lessons in agriculture. These with press notices and circular letters, made a total of 53,500 copies printed and issued during the year.

The staff employed in the branch includes twenty permanent and six temporary employees, made up of fourteen clerks, four messengers, and eight packers.

III. PATENTS OF INVENTION.

The following tables show the transactions of the Patent Office, Department of Agriculture, from April 1, 1914, to March 31, 1915:—

Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.	Notices under Sec. 8.
	Patent.	Certificates.	Total.			
7,302	6,867	1,211	8,078	391	3,391	1,021

PATENT OFFICE FEES FOR YEAR 1914-15.

1914 and 1915.	Amount received.	Notices.	Patents.	Assignments.	Certified copies.	Caveats.	Sundries.	Subscriptions.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	19,358 90	185 55	17,625 90	1,018 05	246 40	217 50	10 00	35 45
May	20,403 65	168 50	18,644 05	802 35	290 30	226 15	31 00	241 60
June	18,608 00	152 00	17,008 45	981 50	293 65	70 00	25 00	77 40
July	16,274 20	175 00	14,968 45	647 85	279 30	159 90	12 20	31 50
August	14,624 40	140 00	13,565 00	603 00	192 20	103 10	14 00	7 10
September	11,818 05	187 00	10,690 90	603 20	179 10	115 00	33 00	9 85
October	14,056 90	149 90	12,763 95	660 15	236 75	150 00	35 00	61 15
November	13,959 97	201 70	12,753 75	548 12	254 25	135 00	12 00	55 15
December	13,041 15	176 00	11,845 70	579 50	119 50	165 15	16 60	65 70
January	15,607 60	156 15	14,319 25	717 15	150 55	230 10	4 00	30 40
February	14,158 40	156 00	12,658 20	746 75	245 55	295 00	16 00	40 90
March	18,136 85	193 90	16,465 00	764 25	222 35	275 15	20 50	196 20
	190,028 37	2,041 80	173,308 60	8,670 87	2,789 90	2,142 05	222 80	852 35

NATIONALITY OF FOREIGN INVENTORS.

Countries.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
United States of America	4,602	5,021	4,885	4,997	4,964	5,220	4,645
Great Britain and Ireland	346	392	359	506	495	558	450
Germany	215	241	304	336	307	300	107
Australia	58	60	77	99	75	76	76
France	59	75	97	108	100	115	83
New Zealand	36	37	33	46	47	50	29
Sweden	40	39	54	52	64	40	40
Belgium	17	20	25	20	28	33	19
Austria	33	23	20	24	40	35	11
Italy	10	8	12	6	16	14	15
Switzerland	11	12	26	23	20	22	14
Denmark	8	8	5	14	15	16	11
Transvaal	12	12	16	10	7	1	3
Hungary	5	7	6	6	6	5	5
Russia	4	14	18	6	17	13	9
Norway	9	18	20	17	10	32	24
Newfoundland	1	2	3	1	2	1	1
Netherlands	4	0	0	.....	.....	7	4
Mexico	4	11	7	10	8	7	4
Cape Province	1	0	3	4	4	1	0
Cuba	0	1	5	1	1	9	3
Spain	2	1	3	.....	.....	1	1
Chile	1	0	1	.....	1	0	0
Finland	1	0	1	.....	1	0	0
Portugal	1	0	0	.....	.....	0	1
Roumania	1	0	1	1	.....	0	1
Grand Duchy of Luxemburg	1	0	0	.....	.....	0	3
Algeria	0	0	1	.....	.....	0	0
Japan	1	2	0	2	2	1	3
India	0	0	5	3	1	7	3
Natal	0	0	0	1	2	0	0
Nicaragua	0	0	1	.....	.....	0	0
Brazil	0	0	2	1	.....	1	3
Turkey	0	0	0	.....	.....	0	0
Poland	3	2	0	.....	.....	0	0
Holland	0	2	11	8	7	8	5
Argentine Republic	4	5	1	1	.....	2	3
Panama (Canal Zone)	2	0	0	3	.....	3	0
Egypt	.....	1	1	.....	.....	1	1
Southern Rhodesia	.....	1	.....	.....	.....	0	0
Peru	.....	.....	.....	3	2	0	0
Hawaii	.....	.....	.....	3	3	0	0
Venezuela	.....	.....	.....	2	1	1	0
Trinidad	.....	.....	.....	1	.....	0	0
Porto Rico	.....	.....	.....	1	2	0	0
Tunis	.....	.....	.....	.....	1	0	0
Ceylon	.....	.....	.....	.....	1	0	0
Straits Settlements	.....	.....	.....	.....	1	0	0
Phillipine Islands	.....	.....	.....	.....	.....	1	1
Canary Islands	.....	.....	.....	.....	.....	1	0
Java	.....	.....	.....	.....	.....	1	0
Channel Islands	.....	.....	.....	.....	.....	1	0
China	.....	.....	.....	.....	.....	.....	1
West Indies	.....	.....	.....	.....	.....	.....	1
Isle of Man	.....	.....	.....	.....	.....	.....	1
Norfolk Islands (South Pacific)	.....	.....	.....	.....	.....	.....	2
Alaska	.....	.....	.....	.....	.....	.....	2
Bermuda	.....	.....	.....	.....	.....	.....	1

The total number of patents granted to Canadian inventors was 1,281, and were distributed among the provinces of the Dominion as follows:—

Ontario.	Quebec.	British Columbia.	Manitoba.	Alberta.	Saskatchewan.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Yukon.
586	278	126	97	71	66	20	33	2	2

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

Provinces.	Patents.	One to Every.
British Columbia	126	3,115
Yukon	2	4,256
Ontario	586	4,306
Manitoba	97	4,697
Alberta	71	5,277
Quebec	278	7,206
Saskatchewan	66	7,461
Nova Scotia	33	14,919
New Brunswick	20	17,594
Prince Edward Island	2	46,864

Statement of the number of patents issued under the Act, on which the fees are paid for periods of six, twelve, or eighteen years, at the option of the patentee; and of patents on which the certificates of payments of fees were attached after the issue of patents originally granted for periods of six and twelve years:—

Period for which fees were paid on first issue.			Patents on which Certificates were attached after issue.		Reissues.		
6 years.	12 years.	18 years.	6 years.	12 years.	6 years.	12 years.	18 years.
6,851	1	15	1,188	23	7	0	0

COMPARATIVE STATEMENT of the transactions of the Patent Office from 1907 to 1915 inclusive.

Year.	Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.	Fees received.
		Patents.	Certificates.	Total.			
							$ cts.
1907	7,077	6,121	634	6,755	285	3,003	169,548 78
1908	7,406	6,774	744	7,518	317	2,900	178,482 49
1909	7,239	6,395	827	7,222	319	3,001	176,692 05
1910	7,789	7,223	1,010	8,233	448	3,147	194,571 54
1911	8,037	7,249	1,002	8,251	406	3,256	200,164 41
1912	8,293	7,399	1,113	8,512	348	3,725	207,762 77
1913	8,681	7,502	1,199	8,701	353	3,741	218,125 02
1914	8,359	7,918	1,323	9,241	354	3,432	215,001 71
1915	7,302	6,867	1,211	8,078	391	3,391	190,028 37

The total number of reports issued by the examiners during the year was 11,285 and 7 patents were surrendered and reissued.

Out of the total number of patents granted by this office during the year there were 4,645 issued to inventors or assignees resident in the United States, being 67 per cent of the whole issue.

This branch of my department continues to receive the official reports of patents from Great Britain, Australia, New Zealand, United States, Mexico, Portugal, Italy, Belgium, France, and Japan, in addition to other periodicals of a scientific nature, in exchange for the Canadian Patent Office Record.

There were 1,857 patents brought under the conditions of the compulsory license clause, section 44 of the Patent Act.

The number of notices under section 8 of the Patent Act was 1,021.

IV. COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT OF FEES received by the Copyright and Trade Mark Branch from April 1, 1914, to March 31, 1915.

Month.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Assignments.	Copies.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1914.							
April	4,026 45	160 80	97 00	6 00	48 20	33 10	4,371 55
May	3,805 65	241 25	150 00	8 00	54 50	65 00	4,324 40
June	4,241 25	173 00	99 00		40 50	59 25	4,613 00
July	2,988 80	126 50	105 15	2 00	26 50	43 75	3,292 70
August	2,384 90	149 80	146 15	2 00	15 00	34 00	2,731 85
September	2,010 15	151 75	96 00	6 00	16 00	25 50	2,305 40
October	2,314 36	175 00	130 00		42 00	22 00	2,683 36
November	2,924 36	134 50	65 10		84 00	23 50	3,231 46
December	2,873 80	222 00	170 00	35 00	24 00	24 75	3,349 55
1915.							
January	2,511 20	148 60	70 00	15 00	37 00	10 50	2,792 30
February	2,241 55	205 65	114 00	6 50	263 65	20 75	2,852 10
March	2,653 65	201 47	132 15	2 25	21 00	41 50	3,052 02
Total	34,976 12	2,690 32	1,374 55	82 75	672 35	403 60	39,599 69
Refunds	6,594 27	45 05	102 00	2 00	9 50	6 00	6,758 82
	28,381 85	2,045 27	1,272 55	80 75	662 85	397 60	32,840 87

The particulars of the registrations made by the Copyright and Trade Mark Branch of the Department of Agriculture during the year ended March 31, 1915, are as follows:—

I. Copyrights—		
Full copyrights without certificates	1,301	
Full copyrights with certificates	180	
Temporary copyrights without certificates	45	
Temporary copyrights with certificates	4	
Interim copyrights without certificates	86	
Interim copyrights with certificates	9	
Renewals of copyrights	23	
Assignments of copyrights	27	
		1,675
II. Trade Marks		1,106
Renewals of specific trade marks		40
Assignments of trade marks		171
III. Industrial Designs		224
Renewals		8
Assignments		49
IV. Timber Marks		24
Assignments		1
Total registrations		3,202

The following tables shows a comparative statement of the business of this branch from 1903 to 1914, inclusive:—

Year.	Letters Received.	Letters sent.	Copyrights Registered.	Certificates of Copyright.	Trade Marks Registered.	Industrial Designs Registered.	Timber Marks Registered.	Assignments Registered.	Fees Received.
1903	2,687	3,211	900	176	557	88	23	272	18,086 25
1904	2,858	3,293	1,106	228	621	107	25	118	20,647 30
1905	3,367	3,902	1,130	189	661	139	22	154	23,706 75
1906	5,340	5,193	1,228	169	1,119	125	47	282	33,107 10
1907	4,475	4,353	1,140	175	848	182	33	136	30,073 20
1908	6,647	4,980	1,416	170	892	162	44	343	37,514 00
1909	6,320	5,750	1,535	171	1,059	143	108	174	38,071 31
1910	6,411	7,688	1,699	206	1,021	118	39	386	42,153 76
1911	7,027	7,091	1,593	213	1,212	149	39	230	46,327 86
1912	9,435	9,322	1,760	205	1,315	128	15	559	51,043 21
1913	8,441	9,220	1,835	207	1,378	165	57	264	49,409 68
1914	8,190	9,292	1,675	193	1,106	224	24	242	39,599 69

V. PUBLIC HEALTH AND QUARANTINE.

By the continued efforts of the Public Health branch, and the skilled watchfulness of the officers working day and night upon our coasts and frontier, the people of Canada have been saved again this year from the inroads of epidemic disease from abroad.

At the coast quarantine stations on the Atlantic and the Pacific, 253,608 persons have been inspected. Along the international frontier between this country and the United States it has been necessary to place—from time to time and at various inland ports of entry—temporary medical quarantine inspectors to prevent the introduction of disease into Canada.

A total of 543 persons were admitted into hospital at the various stations.

In every instance the disease was stamped out at the station, and so prevented from appearing inland.

Asiatic Cholera.—During the past year this disease has been reported in the following countries: Austria-Hungary, Ceylon, China, Dutch East Indies, Germany, Greece, India, Indo-China, Japan, Persia, Philippine Islands, Russia, Siam, Straits Settlements, Turkey in Asia, and Turkey in Europe.

Reports from southern Austria and northern Hungary speak of an epidemic of this disease of extraordinary violence amongst the soldiers and persons in contact with them, accompanied by a large percentage of deaths.

This disease is also present in other parts of the European war zone.

Bubonic Plague.—This disease has been reported during the year in the following countries: Brazil, British East Africa, Ceylon, China, Cuba, Dutch East Indies, Ecuador, Egypt, German East Africa, Great Britain, Greece, Hawaii, India, Indo-

China, Italy, Japan, Mauritius, Persia, Peru, Philippine Islands, Portugal, Russia, Senegal, Siam, Straits Settlements, Tripoli, Turkey in Asia, Union of South Africa, United States, and Zanzibar.

In the United States thirty cases of human plague were reported in New Orleans from June to December last. The number of rats captured was 112,716; examination of 92,104 of these showed 181 rodent cases present. The finding of a plague-infected rat at New Orleans was reported on March 9, 1915.

In California there was a case of human plague last June. The origin of the infection here was undoubtedly ground-squirrels, as the patient had been engaged in cutting hay on squirrel infested lands on which infected squirrels were found, and had also shot and skinned some of them.

It is stated that since the discovery of plague amongst ground squirrels in August, 1908, its presence has been demonstrated on 258 ranches.

At Seattle, Wash., U.S.A., the finding of plague-infected rats has been reported on April 7 and 20, May 8 and 26, October 22 and 31, November 2 and 9, 1914, and on January 11, 1915. In consequence of this, I have in no degree relaxed the enforcement of the special regulations governing such conditions, as detailed in my last two annual reports.

In Java during last October there were 1,661 cases with 1,474 deaths.

In Hong Kong, during the last year, there have been 2,147 cases of plague, with 2,023 deaths.

In India, between January 4 and October 17, 1914, 270,242 cases of plague were reported, with 226,104 deaths.

Smallpox.—This disease has again had a practically world-wide appearance during the year. Cases of it were reported on three incoming vessels at the quarantine station at Grosse Isle in the river St. Lawrence. The disease was in each case stamped out at the station.

Epidemic outbreaks of this disease in the bordering states of Minnesota and Michigan, U.S.A., had caused me prior to my last annual report to institute an international medical quarantine frontier inspection at Rainy River, Emo, Fort Frances, and Sault Ste. Marie. These were still in force at the date of my last report. I was enabled to raise them all on May 31, 1914.

Owing, however, to recurrence of the disease in epidemic form in North Dakota and Minnesota, I instituted a similar frontier inspection at Emo and at Fort Frances, Ont., on December 16, 1914; at Gretna, Man., on December 26, 1914; and at Rainy River, Ont., on January 2, 1915. These inspections are still in force.

Typhus Fever.—Except in parts of Russia and, to a limited extent, in some of the large cities of Europe and Asia, this disease has been fairly dormant for nearly half a century. Within the last two or three years, however, it has shown marked signs of recrudescence. Cases have been brought once again to our quarantine stations, and to those also of contagious ports in the United States.

Two vessels brought this disease to the quarantine station at Grosse Isle in the river St. Lawrence, this year.

This disease is now stated to be raging in Serbia and in Austria. The deaths from it amongst the soldiers are already said to exceed 50,000. In hospital work in Serbia alone, 192 physicians have already perished. Budapest is also a hotbed of the disease, and in Przsmysl on the 20th of the month, March, 1915, there were stated to be 15,000 cases.

Leprosy.—There are at present in the Leper lazaretto at Tracadie, N.B., sixteen leper patients, the smallest number for years; seven males and nine females. Twelve French Canadian (or Acadian) origin, two of English, one of Icelandic, and one of Russian. Amelioration of symptoms and sufferings is claimed to be following the system of treatment now being carried out at the Lazaretto. The two former inmates discharged, apparently cured, in 1912, remain in good health.

There were four deaths during the year, and one new patient was admitted.

Beriberi.—The literature and quoted experience of the year have added to the proof that beriberi is definitely one of the "deficiency diseases," and that the question of its complete eradication is merely one of the supply of the proper food in the places in which the disease occurs, together with the persuasion of the people to use the food thus supplied.

Enteric Fever.—Facts as to the efficacy of anti-typhoid inoculation accumulate almost daily. In the armies of the world, Great Britain, the United States, France, Italy, and Japan, the results of the method have been conspicuously brilliant. This so-called vaccination against this disease has spread into Spain, Portugal, the Canary Islands, England, Belgium, Denmark, Switzerland, Egypt, Italy, Sicily, Greece, Roumania, Russia, Turkey in Europe, Turkey in Asia, the United States, Canada, Columbia, Costa Rica, Ecuador, Guatemala, Venezuela, Brazil, Argentine, and Uruguay.

Change in Medical Staff.—At the date of my last annual report there was a vacancy in the position of assistant medical officer and bacteriologist at the quarantine station at William Head, B.C. To this office on May 1, I appointed Dr. Alfred G. Long, but allowed him to resign, as finding the work and exposure too great for him on June 4. On June 17 I filled the office by the appointment of Dr. Chester P. Brown, who is performing the duties very satisfactorily.

I regret having to say that Dr. A. A. McLellan, the Quarantine Officer at Summerside, P.E.I., died on the 20th instant.

Circulars.—Circular letters were issued from time to time to the different officers, drawing their attention to the various matters during the year connected with the appearances and movements of epidemic diseases abroad.

Public Works Health Act.—Both the inspectors under this Act—Mr. C. A. L. Fisher for Eastern Canada, and Dr. A. E. Clendenan for Western Canada—report that the general health conditions have been unusually good this year amongst the men employed in the various works of railway, tunnel, canal, and irrigation construction coming under their inspection. As a rule the sanitary condition of the camps

was good, the medical service adequate, the hospital accommodation excellent, and the sleeping quarters and boarding of the men fully equal to the good conditions reported previously.

Aftermath of the War.—History tells us war is ever accompanied and followed by pestilence. The present war, with its carnage quite unprecedented in the history of the world, and its enormous aggregations of troops, etc., is already proving the truth of this in spite of the advances of modern sanitary science. Cholera, plague, and typhus fever are reported to be spreading steadily.

There is for this country the immediate danger of disease being brought by invalided or other soldiers returning from the war zone. Then the danger upon the return of our forces at large when the war is over, and demobilization takes place. And finally the possibility of a large immigration after the war. As Earl Grey has recently expressed it, thousands of young men hitherto accustomed to office work will never find such occupation congenial after the active life now being experienced. Consequently, the wider life which the overseas Dominion offer will appeal to them.

On these accounts, the quarantine service at our different ports promises from now on to assume even greater importance than ever before.

The whole respectfully submitted.

MARTIN BURRELL,
Minister of Agriculture.

PUBLIC HEALTH.

APPENDIX No. 1.

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH.

F. D. Montizambert, I.S.O., M.D.Edin., F.R.C.S.E., D.C.L.)

March 31, 1915

Sir,—I have the honour to submit this my report as Director-General of Public Health for the year ending this day.

Asiatic Cholera.—Since my last annual report this disease has been reported in the following countries: Austria-Hungary, Ceylon, China, Dutch East Indies, Germany, Greece, India, Indo-China, Japan, Persia, Philippine Islands, Russia, Siam, Straits Settlements, Turkey in Asia, and Turkey in Europe.

Epidemics of cholera are reported to be threatening the various armies, especially those engaged on the Russo-Austrian frontier. But it will be remembered that even in the normal state of affairs cases of Asiatic cholera in this neighbourhood are not unusual. Cholera is a disease whose spread is dependent largely on infected drinking water and carriers, apparently healthy. So far as is known, infection occurs only through the alimentary tract; this is to say, the germ must be swallowed. It seems probable that in addition to water as a source of infection, food when exposed may become contaminated with the organism—as for instance through the agency of flies. The germ is passed with the fæces, and unless there are efficient sanitary precautions, water supplies are likely to become infected. Therefore, in the passage of large bodies of troops, when sanitation cannot be perfect, an outbreak of this disease may be expected. The cholera organism, the comma bacillus, is especially sensitive to drying, and there seems to be a doubt whether or not it is able to multiply outside of the body in impure water. In the recent Balkan war cholera was reported in many places and many cases occurred, but the disease never became epidemic. With the assistance of the highly efficient sanitary services of modern armies, widespread epidemics of such diseases may be prevented. Soldiers are observed carefully, and in efficient camps a soldier who has frequent stools is reported to medical officers, isolated and his symptoms watched. It has been suggested that the coming of winter may lend aid in preventing the spread of cholera. However, the increased moisture and seepage of surface water carrying contaminating material, as well as the closer contact of human beings engendered by the winter season, make infection still more likely. As an aid to protection, active immunization of men with the Haffkine vaccine may be practised. Possibly conditions in this war will be the means of determining still more exactly the status of this protective measure.

Travellers from Southern Austria report a shocking condition among the cholera patients and wounded arriving from the front. The men are described as lying on filthy straw, destitute of sanitary accommodations. The attendants of cholera patients are permitted to go to the homes of relatives without any precautions against contagion having been taken, according to the travellers. There are not sufficient physicians to care for the ill and wounded, as many medical men have been killed on the battlefield. They have made a practice of seeking the wounded, accompanied by police dogs, and so are made easy marks for Serbian sharpshooters.

On Wednesday in a large town and district in Northern Hungary, the despatch says, "there were ten thousand cases among the soldiers and persons having been in contact with them. The epidemic is extraordinarily violent, and a large percentage of the stricken persons die after a few hours."

Between October 18 and November 21, 2,705 cases, with 754 deaths, were reported.

On cholera in Manila, Philippine Islands Doctors Goff and Denny report to the *Medical Record* as follows:—

> After an absence of four months, cholera appeared in the city of Manila in July, 1914. The present epidemic, in which there were reported more than 1,100 cases, suspects and "carriers," did not differ greatly from the ordinary small epidemic. All patients, excepting those who died without medical attention, were treated at San Lazaro hospital.
>
> Of the number mentioned, 330 were genuine cases of cholera, 170 not cholera, and 570 were carriers, so-called; ninety-nine were found dead and sent to San Lazaro morgue for confirmation of diagnosis. The total number of deaths with and without medical attention was 190.
>
> The percentage of recoveries among those receiving medical attention at San Lazaro was 72·5.
>
> When a patient is admitted to the hospital, a stool specimen is at once taken and sent to the Bureau of Science for bacteriological examination, and no patient is discharged until at least two successive stool specimens taken on different days are reported negative for cholera vibrio.
>
> When a case is beyond doubt clinically cholera, it is carried on the hospital records as cholera, and a case pronounced cholera at necropsy is taken up as such. When a case is merely possible or even probable cholera, either clinically or at necropsy, the final diagnosis depends entirely on the laboratory findings, so that there is little chance for error in the ultimate status of a case. The clinical diagnosis of Asiatic cholera was confirmed bacteriologically in 85 per cent of the cases.
>
> In the recent occurrence of cholera in Bilibid Prison, out of a total daily average of some 2,400 prisoners, eighty-four have been found by the Bureau of Science to be positive cholera carriers, or 3 per cent. Of these carriers, who were held in complete isolation, four developed cholera after being found to be carriers. One developed the disease four days after being found positive, one sixteen days, one seventeen days, and one eighteen days. In the quarantined cell houses, cases have occurred at from two- and three- up to twelve- and thrteen-day intervals. At the San Lazaro detention camp one cholera carrier developed an attack of the disease twenty-one days after being found positive. All this has an intensely practical bearing as it illustrates the futility of the usual five-day quarantine as an effective safeguard against the spread of cholera in a very respectable percentage of infections. It also explains very many outbreaks most difficult to understand under the old hypothesis of a five-day incubation period of cholera. Also it very clearly shows the absolute necessity in fighting cholera in looking for the infection outside of the actual cholera cases.
>
> In the present outbreak in Manila, the search for cholera carriers is being prosecuted at the rate of about two thousand examinations a day, and about twice as many carriers as actual cases have been found and isolated. These carriers require about two weeks, on an average, to clear up, and it is evident that if allowed to remain at large they would be a far greater danger to the public safety than actual cases. Indeed, it is believed by Major Munson, acting director of health, that a most serious epidemic in Manila has been averted only by the systematic and persistent searching out and isolation of the cholera

carriers. No effort is being made to examine the population as a whole for cholera; but all contacts with cases, all residents of a vicinity where a number of cases have occurred, and all persons handling food are examined.

Wolter alludes to recently expressed beliefs in connection with cholera incidence in the Balkan war, that sudden explosions of the disease can only be explained by contact infection; but while one author assigns relatively small importance to this factor, another regards it as of paramount significance. The fact that one body of troops may fall victim to the disease, while another close at hand may show no morbidity whatever from the same, naturally suggests contagion rather than local factors of time and space. But sharp local demarcation has always characterized the incidence of the cholera epidemics. Local outbreaks appear to stand in relation to certain river valleys, and it has often been noted that after removal from certain localities the visitation ceases. The author cites many accounts of the recent epidemic appearance of cholera, and carefully avoids any reference to bacteriology. While drinking water epidemics are mentioned, there is hardly any consideration of the exact transmission of the disease. The latter, however, is grouped rather with typhoid and dysentery, than with typhus, in which contact infection is the sole channel of transmission. Dealt with along old epidemiological lines, the question of propagation lies between contact infection, fomites, and purely local conditions. The latter includes soil water, drainage, the weather, and other purely external factors. In the epidemic transmission of diseases, the simple elements which explain sporadic transmission naturally fall short in accounting for the facts, just as they fail to explain the severity and mildness, and the self-limitation of epidemics.

Bubonic Plague.—This disease has been reported during the year in the following countries: Brazil, British East Africa, Ceylon, China, Cuba, Dutch East Indies, Ecuador, Egypt, German East Africa, Great Britain, Greece, Hawaii, India, Indo-China, Italy, Japan, Mauritius, Persia, Peru, Philippine Islands, Portugal, Russia, Senegal, Siam, Straits Settlements, Tripoli, Turkey in Asia, Union of South Africa, United States, and Zanzibar.

The *Journal* of the American Medical Association published, on January 2 last, the following article on the pneumonic form of this disease:—

The outbreak of the great pneumonic plague in Manchuria a few winters ago afforded the first larger opportunity to study the pathologic anatomy of this disease and to examine histologically the lesions that are produced by it. To the earlier reports, and particularly to those of the American investigators, Strong, Crowell, and Teague, are now added the notes collected by Dr. Wu Lien-Teh, director and chief medical officer of the North Manchurian Plague Prevention Service, and Prof. G. Sims Woodhead of the University of Cambridge, England.

They believe that the specimens examined by them afford evidence of the presence of an extremely acute septicæmic condition in pneumonic plague. The heart is evidently affected by very active toxins. The liver shows typical examples of lesions produced by specific infective micro-organisms that give rise to toxic substances. The epithelium of the kidneys is modified by a similar toxic activity. It is stated that in the lungs the lesions are far less marked than one would expect were pneumonia the main or most important factor in the disease. The descriptions in the literature of the subject indicate that in plague at least two types of pneumonia, and perhaps even further modifications of these types, are to be dealt with. They differ materially from that set up by the *Diplococcus pneumoniae,* which was never found in the tissue sections.

The views of these latest investigators on the mode of infection is of more general interest. They conclude that in the Manchurian outbreak the amount of the infective material, that is, the dose of the plague bacillus, gaining access to the upper respiratory passages—to the tonsils, fauces, etc.—is of prime importance in determining the character of the septicæmia or baceriæmia resulting from a pulmonary infection. It is suggested that in warm countries where the people live in the open and where the facilities and channels by which infection is communicated appear to be those provided by rats and fleas, and where the plague material is carried more directly from one patient to another, or from the rat, by the flea, to the human subject, the local reaction of the tissues and the bubo may prevent the extension of the bacteria, especially if the dose is small and the septicæmic condition occurs at a comparatively late stage. If there is a good reaction of resisting tissues the disease may never become septicæmic. If, however, the septicæmia once develops, it is evident that the internal organs are affected much as in the pneumonic form of plague.

Applying their contentions directly to the Manchurian epidemic, which was at its height in the winter, Lien-Teh and Woodhead argue that the facilities for the inhalation or ingestion of large numbers of plague bacilli were far greater than they can possibly be in warm countries where people live in the open. The patients, residing in badly ventilated houses, closed because of the intense cold, and artificially heated, may be regarded as living in highly infected incubators of the most approved kind. Septicæmias are rapidly developed; and although the lung may in a certain proportion of cases be the primary seat of infection, the late lung symptoms observed seem to point to the occurrence of a secondary pneumonia in a certain proportion of the cases examined clinically.

We have already referred to Teague's views regarding the spread of pneumonic plague. The essence of the contentions put forth in the contribution from the Cambridge pathologic laboratory consists in ascribing the fatal severity of the Manchurian epidemic to the fact that the dose of infective material was always massive, and entered by always open and slightly resistant portals. Under such conditions the prognosis is bad. When the advance of the *Bacillus pestis* is so interfered with that not only a local, but a general immunity may be acquired before the bacilli can reach the blood in any considerable numbers, the virulence is greatly lessened.

Cuba: In the same number of the *Journal*, Dr. G. M. Guiteras, Surgeon United States Public Health Service, gives the following report upon plague in Havana:—

The first case of plague known to occur in Havana, Cuba, was discovered July 6, 1912, in the person of a Spaniard residing at No. 2 Mercaderes street. Two additional cases occurred July 12 and 22 at Justiz and Baratillo streets, about four blocks distant from the first case. The district involved in this infection is about three blocks from the water front and in the wholesale commercial district of the city.

The infection was at first supposed to have been imported from Porto Rico, the capital of which, San Juan, was at the time plague infected. Subsequent investigation, however, by the Cuban health authorities, indicate that the infection was a direct importation from the Canary Islands, where plague was present at the time, though concealed and stubbornly denied by the Spanish authorities.

Owing to the early discovery of the disease, and the thorough and excellent work of the Cuban Sanitary Department, this outbreak was confined to the three cases mentioned above.

About one year and a half later, that is, February 22, 1914, the first case of plague of the present outbreak was discovered in Havana at No. 1 Officios

street, which is in the block adjacent to that in which the first two cases occurred in 1912. Whether this second appearance of plague was simply a continuation of the old infection or a new importation is a moot question. The former is the more reasonable view, and is supported by Dr. Juan Guiteras, Director of Health of Cuba. The case of February 22 was followed by twenty-four other cases, making a total of twenty-five within the city of Havana. The last case occurred June 22.

Two other cases were found in the neighbourhood of Havana, the first at Artemisa, 45 kilometres to the southwest of the city, April 18, the second at San Jose de las Lajas, a town about 25 kilometres southeast from Havana, June 15. As the infection in both these cases was clearly traceable to Havana, and they were treated in that city, these properly belong with the Havana series.

May 30 an infected rat was found in the freight station in the town of Jaruco, 37 kilometres to the eastward of Havana on the railway between that city and Matanzas. The station and surrounding structures were disinfected, and there were no further developments.

June 23 a case suspicious of plague was reported from Santiago dé Cuba in the eastern extremity of the island. Later it was confirmed, after inoculation tests and the exposure of guinea-pigs in the infected locality had shown positive results. Plague-infected rats were found about the same time.

It may be considered as more than probable that the spread of plague infection outside of the original focus in Havana was due to the action of a Mr. Gonzales, a wholesale provision merchant who, when one of his employees sickened with what he thought might be plague, and later was confirmed as such, concealed it, and, knowing that as soon as the case was discovered his warehouse would be quarantined and fumigated, disposed of as much of his stock as possible, sending it to various parts of the city of Havana and throughout Cuba, including the subsequently infected points, San Jose de las Lajas, Jaruco, and Santiago de Cuba. He is at present being prosecuted before the courts.

It should be observed that two weeks prior to the appearance of the first case of the present outbreak in Havana, the sanitary authorities had noted some rat mortality. Anti-rat measures were put into effect at once, even before the discovery of the first human case of plague. With a few exceptions, all the cases may be traced directly or indirectly to the original focus near the Havana water front.

A secondary well-marked focus developed later in the extensive stables of the Department of Public Works in Figuras street. Two infected rats were found here, the first, April 17, the second, April 24. These are the only infected rats found in Havana. This focus gave rise to six cases.

On account of the character of the stable buildings and grounds, disinfection by the usual methods was futile, and the Sanitary Department decided to destroy the infection by fire.

The stables and everything within them, except the animals, carts and harness, were converted into ashes, April 25. This radical measure was effective in destroying a very menacing focus of infection. No other case developed from this source, except perhaps case 25, in which the place of business of the patient, No. 2 Concha street, was on the route taken by the employees, animals and equipment of the stables destroyed, when they were moving into new quarters.

A paper of New Orleans, U.S.A., published the following under date October, 12, 1914:

The Federal Government is helping this city to rid itself of rats, those carriers of the fleas that carry the bubonic plague.

On June 19 a case of bubonic plague was discovered here. A hurry call was sent to the Public Health Service, and a strenuous campaign was started to stamp it out. The Government was concerned in preventing its spread to other sections of the country. And the task is costing the Government $27,000 a month.

There are three kinds of rats, but the worst is the Norwegian rat. He is the nomad of the rodent family, a militant brute that soon cleans out all others of his tribe. It is he who carries the flea whose bite causes the bubonic plague. And he carries it everywhere. Plague is thought to have reached New Orleans from the Orient via Liverpool, which trades largely with the east.

The rats are being exterminated with poison and with traps. Several expert rodentologists were brought from San Francisco, and they have trapped as many as 7,724 rats in a single week.

Thousands of rodents have been examined for infected fleas, and in all 121 plague stricken rats have been found. About twenty-five cases of plague among humans have developed, with six deaths. No new cases have been reported among humans for some time, but infected rats are constantly being trapped. A few days ago a Chinese restaurant was condemned and demolished, and in the process no less than thirteen rats bearing parasites were found.

The fight has been going on since early June, and the situation is now well in hand. Various bodies planning to hold conventions in New Orleans have been notified that the city is quite safe. But the battle is by no means over. The Norwegian rat is a hardy brute, and there is always danger of a fresh outbreak.

It is a herculean job to ratproof an ancient rabbit-warren of a city like New Orleans. The city has been divided into districts, each under the charge of a doctor of the Public Health Service, and a survey has been made of each district, of all rat-breeding or rat-harbouring places noted; and now they are cleaning up the place. Holes are being stopped up; buildings raised or lowered so that they clear the ground sufficiently to allow free circulation of air and sunshine or else hug to it too closely to afford shelter to the rodent; walls and foundations are being fixed to keep the rats from getting through. Nuisances have been abated in over 1,000 places, and disinfectant and fumigation chemicals are being used liberally. Standing garbage, stable refuse and the like are anathema. Permits for keeping chickens are being revoked, for chicken feed is a great attractor of rats.

The wharves and docks and the railway freight yards are being gone over. Every ship before leaving the port is fumigated with sulphur or carbon monoxide. An attempt is being made to ratproof the wharves, but it is only partially successful, for a really ratproof wharf must be almost entirely of concrete.

New Orleans being a great distributing centre for freight for the west and southwest, an enormous number of freight cars must be inspected, ratproofed if necessary, or fumigated. In one week over 3,000 were inspected, of which seven were condemned.

Infant mortality, particularly from summer bowel complaints and the like, has fallen greatly since the beginning of the anti-plague crusade; so has the general death-rate.

The Federal Public Health Service has over two hundred men engaged in the work here.

A total of thirty cases of human plague was reported in New Orleans from June to December 25, 1914. The last case occurred September 30. The total number of rats captured up to October 10 was 112,716. Examination of 92,104 of these showed 181 rodent cases present.

The finding of a plague-infected rat at New Orleans was reported March 9, 1915. The rat was found at a point eighteen squares distant from the nearest known point of infection.

California: In the Public Health Report of the United States Public Health Service, J. D. Long, Surgeon of that service, says:—

> In order that a clear understanding may be had of the present situation with regard to plague in the state of California it will be necessary to review briefly the past history of plague in the state.
>
> Plague was first reported in California about the year 1900, and from that time until 1904 cases occurred from time to time.
>
> From 1904 until 1907 no case was reported.
>
> In May, 1907 a sporadic case was reported at the Marine hospital. The outbreak proper began in August, 1907, and continued in the city of San Francisco until January, 1908. During this period 159 human cases occurred. During the same period fifteen cases occurred in Oakland, one in Berkeley, and one in Point Richmond. During the period from 1908 until the present time cases have occurred as follows in the counties outside of the cities above mentioned:—

	Cases.
Contra Costa county	4
Alameda county	2
Los Angeles county	1
San Benito county	2
Santa Clara county	1
San Joaquin County	1

> Total number of cases, 187.
>
> In the last human case of plague to occur in California the patient sickened at Walnut Creek, Contra Costa county, in May, 1914, and made an uneventful recovery. This case was mild and typical.
>
> During the period from August, 1907, to October, 1908, 398 plague-infected rats were found in the city of San Francisco, and from September, 1907, to December 1, 1908, 125 plague-infected rats were found in the city of Oakland.
>
> In August, 1908, the discovery was made that plague existed among the ground squirrels, which have heretofore so plentifully infested the lands comprised in the rural districts of California. Since that time a total of 1,957 plague-infected squirrels has been found, scattered over an area of approximately 13,000 square miles, which comprises the counties of Contra Costa, Alameda, San Joaquin, Stanislaus, Santa Clara, Santa Cruz, Monterey, San Benito, and Merced.
>
> From August, 1908, to the beginning of 1912 the efforts of the United States Public Health Service and the California State Board of Health, acting in co-operation, were directed toward outlining or delimiting the area in which plague infection existed. For this purpose, hunting operations were conducted all over the state of California and in portions of Oregon, Nevada, and Arizona. No infection was found in any part of California except in the nine counties mentioned above, nor was infection found in any of the other states referred to.

With regard to the case of human plague which occurred at Walnut Creek, Cal., June 8, 1914, Surgeon Long states:—

> The origin of the infection was undoubtedly ground squirrels, as the patient had been engaged in cutting hay on squirrel-infested lands. He had

shot and skinned squirrels within two weeks prior to his illness, and keeps a pet cat which has on several occasions captured young squirrels and brought them into the house.

Hunters detailed to the vicinity of the patient's residence have since discovered squirrels which present evidence of having been infected with bubonic plague.

Since the discovery of plague amongst ground squirrels in August, 1908, its presence has been demonstrated on 258 ranches. The following table from the United States Public Health Reports is of interest:—

Places in California.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squirrel plague.	Total number rodents found infected since May, 1907.
Cities:				
San Francisco	Jan. 30, 1908	Oct. 23, 1908	(1)	398 rats.
Oakland	Aug. 9, 1911	Dec. 1, 1908	(1)	126 rats.
Berkeley	Aug. 28, 1907	(1)	(1)	(1)
Los Angeles	Aug. 11, 1908	(1)	Aug. 21, 1908	1 squirrel.
Counties:				
Alameda (exclusive of Oakland and Berkeley).	Sept. 24, 1909	Oct. 17, 1909 (2)	Aug. 7, 1914	286 squirrels, 1 wood rat.
Contra Costa	May 17, 1914	(1)	Oct. 23, 1914	1,565 squirrels.
Fresno	(1)	(1)	Oct. 27, 1911	1 squirrel.
Merced	(1)	(1)	July 12, 1911	5 squirrels.
Monterey	(1)	(1)	Apr. 10, 1914	6 squirrels.
San Benito	June 4, 1913	(1)	Sept. 26, 1914	36 squirrels.
San Joaquin	Sept. 18, 1911	(1)	Aug. 26, 1911	18 squirrels.
San Luis Obispo	(1)	(1)	Jan. 29, 1910	1 squirrel.
Santa Clara	Aug. 31, 1910	(1)	July 23, 1913	25 squirrels.
Santa Cruz	(1)	(1)	May 17, 1910	3 squirrels.
Stanislaus	(1)	(1)	June 2, 1911	13 squirrels.

(1) None.
(2) Wood rot.

The work is now being carried on in the following named counties: Alameda, Contra Costa, San Francisco, Merced, San Joaquin, Santa Cruz, Stanislaus, San Benito, Santa Clara, and San Mateo.

Passed Asst. Surg. Hurley reports the finding of two plague-infected ground squirrels in Contra Costa county, California, March 3 and 4, 1915.

At Seattle, Wash., U.S.A., the finding of plague-infected rats has been reported on April 7 and 26, May 8 and 28, October 22 and 31, November 2 and 9, 1914, and on January 11, 1915.

Liverpool, England.—In August last there were nine cases of plague in Liverpool, with three deaths.

During the two weeks ended January 30, 1915, 411 rats were examined at Liverpool. No plague-infected rat was found. The total number of rats examined from July 25, 1914, to January 30, 1915, was 5,683. No plague infection was found.

Port Said: A case of plague was notified at Port Said, December 16, 1914.

At Guayaquil, November, 1914, 111 cases, with forty-seven deaths.

In Java, during the month of October, 1914, as follows:

Districts.	Cases.	Deaths.
Kedru	492	455
Madioen	110	96
Pasoeroean	878	756
Surabaya	181	167
Total	1,661	1,474

Mauritius: During the week ending November 12, 1914, fourteen cases of plague were notified.

Senegal: The port of Dakar was reported plague-infected December 5, 1914.

Shanghai: During the week ended December 5, 1914, 235 rats were examined. Six plague-infected rats were found.

Hongkong: During the last year there have been 2,147 cases of plague, with 2,023 deaths.

In India, between January 4 and October 17, 1914, 270,242 cases of plague were reported, with 226,104 deaths.

The following summary of recommendations towards reducing the number of rats has been published:

1. Protection of our native hawks, owls, and smaller predatory mammals—the natural enemies of rats.

2. Greater cleanliness about stables, markets, grocery stores, warehouses, courts, alleys, and vacant lots in cities and villages, and like care on farms and suburban premises. This includes the storage of waste and garbage in tightly covered vessels, and the prompt disposal of it each day.

3. Care in the construction of buildings and drains, so as not to provide entrance and retreats for rats, and the permanent closing of all rat holes in old houses and cellars.

4. The early threshing and marketing of grains on farms, so that stacks and mows shall not furnish harbourage and food for rats.

5. The removal of outlying straw stacks and piles of trash or lumber that harbour rats in the fields.

6. Ratproofing of warehouses, markets, cribs, stables, and granaries for storage of provisions, seed grain, and feedstuffs.

7. Keeping effective rat dogs, especially on farms and in city warehouses.

8. The systematic destruction of rats, whenever and wherever possible, by (*a*) trapping, (*b*) poisoning, and (*c*) organized hunts.

9. The organization of rat clubs and other societies for systematic warfare against rats.

Smallpox.—It would be shorter to enumerate the countries (if any such there be) in which this disease has not shown itself during the year, than those in which it has. This is an annual condition of things, and it will continue until vaccination and re-vaccination become more general. Cases of it were reported on three incoming vessels at your quarantine station at Grosse Isle in the River St. Lawrence. From the *ss. Canada,* from Liverpool, it was found necessary to land for quarantine of observation, 304 persons, and to vaccinate 896. In the case of the *ss. Montreal,* from Antwerp,

175 contacts were landed, and 206 vaccinated. In the case of the ss. *Wittekind*, from Rotterdam, 101 contacts were landed, and 719 persons vaccinated. No further cases occurred, and the disease was in each case stamped out at your quarantine.

Typhus Fever. Except in parts of Russia and the large cities of Europe and Asia this disease has been fairly dormant for nearly half a century.

Since November 19, 1913, cases of typhus fever have been discovered in immigrants arriving at Atlantic ports from Europe. Seven of these cases arrived at Providence from Marseilles and Naples, and twelve at New York quarantine, mainly from southern European ports.

Within recent years it has been demonstrated that typhus fever is spread from man to man by the body louse, and that apparently this is the only way in which it is spread. This makes the control of the disease comparatively simple when it exists in small foci, and its control even in large outbreaks has been rendered not difficult.

During the latter part of February of this year, typhus fever became epidemic in Tokio, Japan, and from March 20 to April 5 there have been notified 1,750 cases. Epidemics of this size have been exceedingly rare during recent years. In the Tokio outbreak the fatality rate has been reported to be approximately 12 per cent. This is of interest as showing the variations in the virulence of the disease. Higher fatality rates have been given in times past, also much lower fatality rates, an illustration of the latter being the absence of fatality in the type which has been present to a limited extent in New York City and undoubtedly in other American cities for a number of years. Reference is made to what is known as Brill's disease, but which is without doubt typhus fever.

Immediately upon the onset of the outbreak in Tokio, the Public Health Service officer stationed there, in co-operation with the American consul, put into operation the United States quarantine regulations as they related to ships clearing and passengers embarking for United States ports. Passengers from infected territory are detained, bathed, and their clothing disinfected. It is possible that occasional cases of the disease may arrive at Pacific ports in spite of these precautions, and they should be watched for.

Writing in the *Journal* on the etiology of typhus fever and its analogue Brill's disease, Dr. Harry Plotz, of New York, states:

> Basing my opinion on some theoretical considerations and on previous investigations, I considered it advisable to search for an anaerobic organism as the etiologic factor in the acute infectious disease of unknown origin which Brill differentiated from typhoid fever. By the use of anaerobic methods in six cases of Brill's disease, I obtained the same organism in five; the case in which the organism was not obtained was investigated only after the crisis. Inasmuch as studies made during the past few years have shown that Brill's disease is probably a mild form of typhus fever, I decided to apply the said methods to the study of the latter. Through the kindness of Dr. Joseph O'Connell, health officer of the port of New York, to whom I am deeply indebted, I was enabled to study six cases of typhus fever at the height of the disease, and from all of these I recovered an organism that appears to be identical with that isolated from the cases of Brill's disease. A large number of control cases was studied, and the organism was absent from each.
>
> The organism is a small, Gram-positive, pleomorphic bacillus, from 0·9 to 1·93 microns in length, the breadth being from one-fifth to three-fifths of the length. It is not acid-fast, has no capsule, and polar bodies can be demonstrated with appropriate methods. The organism, when first isolated, grows only anaerobically, but after a time it can be grown aerobically.

Complement fixation tests were made by Dr. [illegible] and myself, using the serum of eight cases of typhus fever and antigens made up from organisms obtained both from cases of Brill's disease and typhus fever. Complement fixation reactions were negative during the course of the disease, but at or after the crisis, fixation was found to be present in varying degrees in six out of eight cases.

The antigen made from the bacillus obtained from the cases of Brill's disease binds the complement in the same manner as the antigen made from the bacillus isolated from the cases of typhus fever. Complement-fixation tests were made in thirty-six control cases with absolutely negative results.

Intraperitoneal inoculation of a pure culture of the organism into guinea-pigs produce a rise of temperature in from twenty-four to forty-eight hours, the temperature remaining high for four or five days, and then dropping by crisis. This corresponds to the reaction seen in guinea-pigs after inoculation with defibrinated blood from typhus fever patients, except that the incubation period is shorter. Serum from a convalescing typhus patient was proved to have bactericidal properties against the organism obtained from Brill's disease and typhus fever.

In a later communication it is proposed to consider the cultural characteristics of the organism, its agglutination reactions, the further results of animal experiments and cross immunity tests. At the same time the results of studies forming a basis for a possible vaccine prophylaxis, and comparative studies of other organisms described by various authors as being found in typhus fever, will be reported.

This disease is now raging in Austria and in Serbia.

Of the contingent of six physicians and twelve nurses sent to Serbia by the American Red Cross Society since the European war began, all except four have contracted typhus, the disease they were combating, according to Dr. M. P. Lane, of New Orleans, a Red Cross physician.

"It is impossible to convey in words the condition of Serbia," said Dr. Lane. "When we arrived we found the country in the grip of an epidemic of recurrent fever, with a high percentage of fatality. Following the recurrent fever came the scourge of typhus, brought into Serbia evidently by Austrian prisoners. The local physicians, reinforced by medical attaches of the various missionary societies, were utterly unable to combat it, and in almost an incredibly short time the disease had spread through the entire country.

"Deaths were so numerous that it was hard to find means to dispose of the bodies, cremation being the only solution of the problem. In one day during the second week in February there were 450 deaths reported from typhus in the city of Nish alone. Over the entire country it is safe to say that not less than two out of every hundred people, including Serbians and prisoners of war, have died, and the death-rate is rapidly increasing."

The Serbians assert that typhus was introduced by Austrian prisoners of war, who were permitted to wander over the country, and infected the population by spreading vermin, which conveyed the germs of the disease.

The deaths from this disease are already said to exceed 50,000; 192 physicians have already perished from it in hospital work in Serbia.

Budapest is also a hotbed of typhus, and in Pryzemysl on the 20th of this month there were stated to be 15,000 cases.

Leprosy.—There are at present in your lazaretto at Tracadie, N.B., sixteen leper patients, seven males and nine females. This is the smallest number for some years past. There were four deaths during the year, and one new patient was admitted. Twelve are of French-Canadian, two of English, one of Icelandic, and one of Russian

origin. The medical superintendent reports improvement in several cases under the use of the refined form of Chaulmoogra oil.

The two former inmates discharged, apparently cured, in 1912, remain in good health.

From your leper lazaretto at Darcy Island, B.C., the leper reported in my last annual report was deported to China by the Immigration Department on May 13. He had been in Canada fifteen months, and was found up country. The disease only made its appearance several months after his arrival in the Dominion.

In India it is estimated that there must be now at least 250,000 lepers. In Japan it is stated that there are 38,000 families in which leprosy is known to be present. In the United States during the last fifteen years the United States Public Health Service has twice been authorized to make a leprosy survey. In 1902, 278 cases were found. The report of 1912 was practically identical. In Norway, to judge by the following published table, the number of cases shows a steady decrease:—

Years.	Population.	Cases.	Rates per 100,000 population.	Years.	Population.	Cases.	Rates per 100,000 population.
1856.....	1,494,000	2,858	191.3	1905	2,315,000	474	20.5
1875.....	1,803,000	1,752	97.2	1906..... ...	2,330,000	445	19.1
1885.....	1,930,000	1,195	61.9	1907	2,345,000	438	18.7
1890.....	1,982,000	960	48.4	1908.....	2,360,000	394	16.7
1895.....	2,663,000	688	33.3	1909.	2,375,000	360	15.2
1900	2,240,000	577	25.8	1910.	2,390,000	323	13.5

Beri-beri.—There can hardly be any reasonable doubt now that beri-beri and the class of cases of peripheral neuritis to which it belongs is due to some deficiency in the food—call it vitamine or anything else. The fact that the disease has been so completely stamped out of government institutions by substituting slightly milled rice for the old over-polished variety seems clearly to establish this point.

Over two years ago Little described a form of neuritis which is fairly prevalent in Newfoundland and on the coast of Labrador, where many of the natives live on a restricted diet, consisting largely of highly milled white flour. Little, at that time and again later, was of the opinion that the disease was true beri-beri, and more recently Ohler (*Jour. Med. Research*, 1914, xxxi, 239) reports experimental results that bear out Little's conclusions. Ohler fed chickens on various diets over fairly long periods of time, and found that when the food consisted exclusively of white bread, either with or without yeast, hominy, or milled rice, the fowls developed polyneuritis gallinarum in from five to six weeks. On a diet consisting of whole-wheat bread or of wheat grains, or even if cracked corn or wheat was given once a week to birds on the white bread diet, they remained apparently perfectly well, and on autopsy showed none of the signs of the disease. Two birds that were starved for thirty-eight and fifty-six days respectively failed to show typical symptoms or post-mortem findings. It is, of course, not settled that beri-beri and polyneuritis gallinarum are identical diseases, but it would seem that the two conditions are sufficiently alike in their course and etiology to permit of satisfactory conclusions. The evidence certainly seems to point to the fact that white bread as a sole article of diet is undesirable in that it apparently is lacking in the necessary vitamines. It does not, of course, demonstrate that white bread is undesirable when taken in conjunction with other articles of food which will supply the missing vitamines. The evidence has gradually accumulated, and this work has added to it, to prove that beri-beri is definitely one of the "deficiency diseases," and that the question of its complete

eradication is merely one of the supply of the proper food in the districts in which the disease is prevalent, together with the persuasion of the people (not always an easy matter) to use the food thus supplied.

Enteric Fever.—Facts as to the efficacy of anti-typhoid inoculation accumulate almost daily. Perhaps the most satisfactory statistics with regard to the value of the method are those afforded by the United States Army *Medical Record*, December 28, 1914. As pointed out by Major Russell of the Medical Corps, United States Army, in 1911, it was made compulsory for all recruits in the army. The following figures showed the contrast between the state of affairs in the Spanish War and that in 1911. At Jacksonville, Fla., in the earlier campaign there occurred certainly 1,729 and probably 2,673 cases of typhoid fever, with 248 deaths. The strength of the force was 10,579. At San Antonio, when an American army was concentrated on the Mexican border in 1911, 13,000 men were encamped for about the same length of time as in the Spanish War, and among these there were only two cases of enteric fever, and no deaths, though the disease was actually present in the civil population of San Antonio and the troops were allowed to enter the town freely. According to Major Russell, in the army as a whole a great drop has occurred in the incidence of typhoid fever since inoculation was made compulsory. Reports from France are as favourable as those from this country. For example, during an epidemic of typhoid fever in Avignon, the garrison of the town consisted of 2,053 men, of whom 1,366 were inoculated. Among the unvaccinated soldiers, 155 cases of typhoid fever with 21 deaths occurred, while among the vaccinated there was not a single case. All the soldiers lived under exactly the same conditions. Again, in Eastern Morocco, among 962 vaccinated soldiers there was no case of infection, whereas among the non-vaccinated the morbidity was 38·22 and the mortality 5 51 per 1,000.

In the British Army in India the results of the method have been conspicuously brilliant. There the typhoid rate fell in five years from over 15 to under 5 per 1,000, and the death-rate from over 3 to 0·63 per 1,000. During the year 1910, among about 70,000 men there was a total of 306 cases of enteric fever; 151 of these occurred in the 10,000 who were unprotected, and only 155 in the 60,000 who had been vaccinated. Only 11·2 per cent of the inoculated died, and 16·1 per cent of the uninoculated. It must be borne in mind that members of the white race in India are peculiarly prone to typhoid fever, and that up to recent years this has been one of the main causes of sickness and death.

Figures dealing with the efficacy of anti-typhoid inoculation in the Italian and Japanese armies tend to show that the method has greatly decreased the death-rate and morbidity rate from this cause. The Italian statistics are especially favourable, while the heads of the Japanese Army have found anti-typhoid inoculation of so great preventive value that it has been made compulsory.

A paper in Paris, France, under date January 13, 1915, says:—

> The war has demonstrated beyond all question, according to members of the medical commission, the efficaciousness of anti-typhoid vaccination. Most of the members of the active army had been vaccinated before the war, but the reservists and territorials drafted and sent to the front later, had not, and as a result, towards the end of October, a large number of cases of typhoid developed.
>
> The medical commission sent doctors to the firing line, and they vaccinated a whole army corps of 40,000 men.
>
> By the end of December the good results of this treatment became apparent as typhoid had practically disappeared, the only cases remaining being among the men of two regiments which the doctors were unable to reach.

In the Canadian Pacific Railway camps in the province of Alberta, anti-typhoid vaccination has been extensively carried out of late, under the direction of Dr. H. G. Mackid. The results have been most encouraging, for in 1911, among 5,500 men who were inoculated, two only contracted typhoid, while of 4,500 who had not been treated, 220 fell ill with the disease. In 1913, 8,400 men were vaccinated, and only one case of typhoid occurred amongst them; moreover, it is probable that the man was ill at the time of vaccination. During the same year, among 2,000 men who were not inoculated, seventy-six cases of typhoid occurred.

In Canada also every precaution was taken before the First Canadian Expeditionary Force left its home shores, and at the concentration camp at Valcartier, Que., almost twenty-seven thousand men were inoculated with anti-typhoid serum; this required fifty-four thousand injections, and notwithstanding this large number, the largest on record, there were no cases of severe constitutional reaction nor infected arms.

The vaccination has spread into Spain, Portugal, the Canary Islands, England, Belgium, Denmark, Switzerland, Egypt, Italy, Sicily, Greece, Roumania, Russia, Turkey, in Europe and in Asia; United States, Canada, Colombia, Costa Rica, Ecuador, Guatemala, Venezuela, Brazil, Argentine, and Uruguay.

International Frontier Quarantine.—At the date of my last annual report this inspection was in force, on account of smallpox in Minnesota and Michigan, at Rainy River, Emo, and Fort Frances, and at Sault Ste. Marie. It was raised by you at all four places on May 31, 1914.

Owing to fresh epidemic outbreaks of smallpox in North Dakota and in Minnesota, you instituted international frontier quarantine medical inspection against smallpox at Emo and at Fort Francis, Ont., on December 16, 1914; at Gretna, Man., on December 26, 1914, and at Rainy River, Ont., on January 2, 1915. These four inspections are still being enforced.

Aftermath.—History tells us war is ever accompanied and followed by pestilence. The present war, with its carnage quite unprecendented in the history of the world, is already proving this in spite of the advances of modern sanitary science. Owing to the European war, diseases, notably cholera, plague, and typhus fever, are reported not only to have increased in volume at certain points, especially in Serbia and Greece, but the spread of these diseases has been steady in all directions.

On this account the problem of quarantine at the various ports promises from now on to assume greater importance than ever before. Special apprehension is felt regarding the chances of infection being brought in after the war is over, when immigration doubtless will increase in volume, and will include men and women from all walks of life and from nearly all parts of the European war zone.

In addition, there is the immediate danger of disease being brought by invalided or other soldiers returning from the war zone. In this way two cases of epidemic cerebro-spinal meningitis have already been brought by returning members of the Canadian Overseas Expeditional Forces to your quarantine stations at Sydney and at Halifax.

National Quarantine in United States.—This problem recently has led to the consideration by the authorities of New York and Boston of the question of having the United States Government assume the quarantine function at these ports on account of the fact that they are the gateways not only of the states of New York and Massachusetts, but also of the whole nation. In other words, it is becoming more and more apparent that the prevention of the introduction of quarantinable diseases from foreign ports into the United States is essentially one of the functions of the National Government.

Of the twenty Governments of the world which are signatories to the International Sanitary Agreement for uniform quarantine rules and administration, the United States is the only one which has not continuous control of all its quarantine stations. It has absolute control, however, in times of crisis, so that the local health officer exercises his authority only at the tolerance of the Federal Government although at the expense of the State Government.

The anomaly of the local (state or city) control of quarantine has almost disappeared from that country, and if the efforts now being made to effect the transfer of the New York station to the United States Public Health Service are successful, the passing of this antiquated and irrational system will positively be assured. Since 1888 the quarantine functions at sixty-six ports of the United States have been transferred to national control. The Boston quarantine is the latest to make the change, and there now remain but three ports where the Public Health Service is not in full control, viz., New York, Baltimore, and Galveston. The question of transfer is being actively considered at all three of these places, and there is no question that if New York leads the way the other two will follow promptly.

Daylight Quarantine Inspection.—In this connection the following letters are of interest, taken from New York papers of April last:—

To the Editor of the New York Times:

In reply to a letter signed by a number of passengers, including myself, in the nature of a protest at the detention of the Hamburg-American Line steamship *Amerika* until the following morning at Quarantine, where we arrived Saturday evening a few minutes after sundown, I received the inclosed letter from the Health Officer, Joseph J. O'Connell, M.D., which I think is a most reasonable answer. Since the other passengers will not otherwise see it, and since I think it expresses so clearly the necessity for such delay under the circumstances, I think it would be a good idea that it should be published in your paper.

GEORGE WHITEFIELD BETTS, Jr.,

New York, April 28, 1914.

STATE OF NEW YORK,
HEALTH OFFICERS DEPARTMENT,
ROSEBANK, N.Y., April 23, 1914.

Mr. GEORGE WHITEFIELD BETTS, Jr.,
165 Broadway, New York City.

MY DEAR SIR,—Governor Glynn has referred to me for reply your letter of April 21, calling his attention to the fact that the steamship *Amerika,* arriving a few minutes after sundown, was not visited and inspected until the following morning, and inclosing for his consideration a protest signed by certain other passengers predicated upon this circumstance.

I thank you very much for having written this letter, as it gives to me an opportunity of clearing up a little confusion which apparently exists in your own mind and in the minds of the other passengers as to the meaning and wisdom of the law which limits the period of visitation and inspection to the hours between sunrise and sunset.

You say that it is a hardship that 350 people should be kept in the bay overnight when arriving before dark. I know it is a hardship, and the gentlemen who were behind the enactment of the public health law of this state undoubtedly knew it would be a hardship. After a transatlantic voyage, even when the weather has been pleasant, there is a yearning to set foot on land, which is impatient of any opposition, and this notwithstanding the quarters

occupied by the cabin passengers are as comfortable as could be obtained in any first-class hotel. The food is excellent, and the landlocked harbour removes all possible anxiety as to the safety of the ship and its passengers.

The 350 passengers to whom you refer would appear to be the first and second cabin passengers. May I call your attention to the fact that in addition to these there were on board your vessel 977 steerage passengers, who occupied quarters much less luxurious. These steerage passengers are the ones that give sanitary authorities the most concern. Each of them had to be examined for signs of quarantinable disease. Under the most favourable circumstances an adequate examination of a thousand passengers would be difficult to make in less than an hour's time. It was already twilight when the *Amerika* arrived in the harbour. Before the steerage could be mustered it would be dark.

Laymen do not understand what is perfectly well known to all modern sanitary authorities that for the discovery of symptoms of quarantinable disease in the muster of steerage passengers on shipboard, natural light is absolutely necessary. The circumstances at the present time are not the most favourable. Since January 7 of this year this department has removed from in-coming transatlantic lines, eighteen cases of typhus fever, not to mention smallpox and epidemic cerebro-spinal meningitis cases. These cases have not been confined to vessels in the Asiatic or Mediterranean service, but have been encountered on all the great North European lines, even a vessel of the Anchor Line, which leaves Glasgow and touches at Moville only, having been found to carry a case of typhus. In the full light of day the slight rash and congested eyeballs which indicate typhus in its initial stage are difficult enough to discern. By artificial light it would be absolutely impossible to recognize it. Consequently, in dealing with cases such as the one now under discussion it is my duty to weigh the convenience or impatience of cabin passengers against the possibility of introducing to this country epidemic diseases of great violence. The epidemicity of the present typhus visitation is quite marked in countries in which it has gained a foothold. In the week ended April 5, for instance, 1,750 cases, with a death-rate of 12 per cent, were reported from the city of Tokio.

In protecting the public health we must very often interfere with the pleasure of sea-going people, and sometimes even with the profit of steamship companies, but this is never done unnecessarily.

JOSEPH J. O'CONNELL, M.D.,
Health Officer, Port of New York.

I may add that true as these reasons are for the Atlantic ports, they have even more force on the Pacific side owing to the complexion of the Japanese, Chinese, and other Asiatic passengers to be inspected there.

Circulars.—Circular letters were issued from time to time to your different officers, calling their attention to the various matters during the year connected with the appearances of epidemic diseases abroad.

Bulletins, etc., received.—The weekly Public Health Reports of the United States Public Health Service have been regularly received and are of great value, as are also the monthly bulletin from provincial, state, and municipal boards of health in Canada, the United States, and other countries. The bulletins of the International Office of Public Health, Paris, and of the Sleeping Sickness Bureau, London, have been regularly received throughout the year, and in both cases spare copies have been distributed to the provincial boards of health.

Official Visits, Inspections, etc.—On the 19th June last I left, by your instruction, to inspect on the Atlantic coast. I visited the quarantine station at Grosse Isle, Que.; the Leper Lazaretto at Tracadie, N.B.; the quarantine stations at Chatham and St. John, N.B.; Digby, Halifax, Sydney, and Louisburg, N.S.; Charlottetown and Summerside, P.E.I.; Rimouski, Que.; and made a second inspection at Grosse Isle, Que., in connection with the improvements being carried on there.

Whilst at St. John, N.B., I attended as your delegate the annual meeting of the Canadian Medical Association, held on July 7, 8, 9, and 10.

And at Halifax I similarly attended the annual meeting of the Canadian Association for the Prevention of Tuberculosis on July 13 and 14. At both these meetings many interesting and instructive papers were read, and discussions held.

On August 14, I left for the Pacific coast. I inspected at Vancouver, Victoria, William Head, and Prince Rupert, and the Leper Lazaretto at Darcy Island.

On September 18, I was sent by you to the Grosse Isle station on special service.

On September 24, I was delegated by you to attend the meetings of the International Joint Commission in *re* remedies for the pollution of boundary waters, held at Niagara Falls, September 25; Buffalo, September 26 and 27; Detroit, September 29 and 30; Windsor, October 1; Port Huron, October 2; and Sarnia, October 3.

I had also the honour to represent you at the annual meeting of the American Public Health Association (the United States of America, the Dominion of Canada, the Republic of Mexico, and the Republic of Cuba), held at Jacksonville, Florida, November 30 to December 4, 1914. The attendance was close to 400, and the proceedings full of interest.

Changes in Medical Staff.—At the date of my last annual report, Dr. Hunter had resigned as assistant medical officer and bacteriologist at the quarantine station at William Head, B.C., but he had not yet been replaced. On the 1st of May you appointed Dr. Alfred G. Long to the position. He resigned, by your permission, on June 4, and on June 17, you filled the office by the appointment of Dr. Chester P. Brown, D.P.H.

Dr. A. A. McLellan, quarantine officer at Summerside, P.E.I., died on the 20th instant.

Stations, etc., Grosse Isle, Que.—Vessels inspected at this station and its substation at Rimouski, 436. Persons inspected, 149,598. Admissions to hospital, 502. Diseases: typhus fever, smallpox, scarlet fever, chicken-pox, measles, enteric fever, mumps, erysipelas, diphtheria, and enteritis simulating Asiatic cholera. Deaths in hospital, 8.

Infectious disease was reported on no less than sixty-six incoming vessels.

Two steamships arrived with typhus fever. Three vessels arrived with small-pox. From one, with 896 persons on board, 304 contacts had to be landed for quarantine of observation. From a second, with 206 on board, 125 contacts were landed, and from the third, with 719 on board, 104. Vaccinations performed, 1,821.

The station again suffered from its inadequate hospital accommodation. It is of urgent importance that the building of the new hospital which has been begun be pushed rapidly to its completion.

At the substation of Rimouski, and between it and Grosse Isle, Dr. Lepage inspected twenty-five steamers, carrying 29,651 persons; Dr. Bouillon, twenty-one steamers, with 22,769 persons, and Dr. Lord, twenty-three steamers, with 23,162 persons on board.

Halifax, N.S.—Vessels inspected, 311. Persons inspected, 65,830. Infectious disease was reported on twelve incoming vessels. Admissions to hospital, twenty. Diseases: Measles, scarlet fever, chicken-pox, and epidemic cerebro-spinal meningitis. This last case was an artillery man in transit from Liverpool to Bermuda. He was in a comatose condition when landed at the quarantine station, and died the next day.

St. John, N.B.—Vessels inspected, 204. Persons inspected, 19,007. Admissions to hospital, nineteen.

A new first-class detention building has been completed. The new water main has been laid across the channel, connecting it with the city watermain at Fort Dufferin, West St. John. This pipe so far has proved very satisfactory.

Since the dredging has been done in the harbour the current and tide-way are much stronger at the station. In rough weather it is very unsafe, and at times impossible to lighter out to the boarding boat, or to attempt to land sick and other passengers from the incoming steamers. The need of a deep-water wharf is very pressingly felt.

Chatham, N.B.—Vessels inspected, 31. Persons inspected, 579. No quarantinable disease.

Digby, N.S.—Vessels inspected, 1. Persons inspected, twenty-six. One case of measles.

Sydney, N.S.—Vessels inspected, 159. Persons inspected, 4,499. No quarantinable disease. At the request of the Militia Department, a soldier of the Canadian contingent, ill with cerebro-spinal meningitis, was admitted to the quarantine hospital. He recovered, and was duly discharged.

Louisburg, N.S.—Vessels inspected, eighty-six. Persons inspected, 2,233. No quarantinable disease.

Charlottetown, P.E.I.—Vessels inspected, six. Persons inspected, 85. No quarantinable disease.

Summerside, P.E.I.—No vessels, and no quarantinable diseases were reported.

William Head, B.C.—Vessels inspected, 154. Persons inspected, 31,751. One case of chicken-pox. During May, Dr. Long acted as assistant medical officer and bacteriologist, and on 17th June, Dr. Chester P. Brown was appointed to the position.

The new first-class detention building has been completed, and several buildings slate-roofed and brick-veneered.

The C. G. S. *Gunhild* was purchased as an additional tender and arrived on April 22.

Victoria, B.C.—Vessels inspected, one. No quarantinable disease.

Vancouver, B.C.—No report received of any vessels inspected, or of any quarantinable disease.

Prince Rupert, B.C.—No quarantinable disease. The protection work around the hospital island has been done, and a site has been cleared for a third-class detention building.

Tracadie Leper Lazaretto, N.B.—Patients at present, sixteen, three less than last year, and the smallest number for years. Twelve are of French-Canadian, two of English, one of Icelandic and one of Russian origin. Deaths during the year, four; new admission, one. Treatment with Chaulmoogra oil in various forms is being continued. It is being now used in muscular injection in a compound of the oil with camphorated oil and resorcin. The antileprol, the purified product of Chaulmoogra oil, introduced by Dr. Bayon, is being tried.

The two patients discharged as apparently cured, or at least freed from the disease, in February and November, 1912, remain in good health.

The devotion and care extended to the patients by the nursing religious sisters continue to be above all praise.

Darcy Island Leper Lazaretto, B.C.—The leper held at this lazaretto was deported to China by the immigration authorities on May 13.

Public Works Health Act.—Your inspector for Eastern Canada under the Act, Mr. C. A. L. Fisher, states that the year has again been an exceptional one in the

almost complete absence of infectious disease amongst the men employed on the various works of railway, tunnel, and canal construction coming under his inspection. He found the medical service given to be complete, hospital accommodation excellent, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions reported previously. And as a rule, the sanitary condition of the camps was good.

Dr. A. E. Clendenan, your inspector for Western Canada, reports: General health conditions have been unusually good. No contagious diseases of any importance having occurred, except enteric fever, which has been distinctly less severe than for a number of years past. The medical staffs have been kept well up to the requirements of the Act, and on the whole contractors have not been contentious towards suggestions on sanitation.

I have the honour to be, sir,
Your obedient servant,

F. MONTIZAMBERT, M.D.,
Director-General of Public Health.

The Honourable
The Minister of Agriculture,
Ottawa.

APPENDIX No. 2.

(G. E. Martineau, M.D.)

Grosse Isle, Que., 31st March, 1915.

Sir,—I have the honour to submit this my annual report as Medical Superintendent of the St. Lawrence Quarantine Service for the year ended March 31, 1915.

Vessels and persons examined.—There were 436 vessels inspected during the season, being a decrease of six as compared with last year. The total number of persons examined was 149,598, being a decrease, as compared with last year, of 143,970. The above numbers of persons and vessels examined include also those of the Rimouski sub-station.

The decrease in the number of vessels and of their personnel is due to the European war, which completely disorganized the shipping of this port.

The personnel of the ships examined was divided as follows:—

First cabin	8,323
Second cabin	35,498
Steerage	54,571
Cattlemen	73
Crews	51,107
Stowaways	26

Vessels carrying passengers were about 40 per cent of the total number of vessels, which is a decided decrease as compared with former years.

Infectious disease was reported on sixty-six different occasions, and the vessels from which these cases were landed included practically all the passenger vessels coming up the river.

Diseases so reported or discovered were: Typhus, smallpox, scarlet fever, chickenpox, measles, enteric fever, mumps, erysipelas, diphtheria, and enteritis.

On two occasions vessels arrived with passengers who refused vaccination, and these passengers were landed for the usual period of observation.

Deaths during the voyage were reported on fourteen occasions, and were due to: Malnutrition, one; colitis, one; measles, one; erysipelas, one; peritonitis, one; pneumonia, one; lost overboard, four; convulsion, one; cerebral hemorrhage, one; laryngitis, one; diabetic coma, one.

Births were reported on one occasion only, November 14, on *ss. Corinthian,* a male child.

Apart from three vessels having variola and two having typhus fever on board, the *ss. Hanover* from Rotterdam arrived May 29 with a case of enteritis that was very like Asiatic cholera, and this vessel was detained while a bacteriological examination was made.

Smallpox.—Three vessels arrived at quarantine with cases of smallpox amongst steerage passengers. They were:

Vessel's Name.	From.	Departure.	Arrival.	Passengers and Crew.				
				2nd Class.	3rd Class.	Crew.	Landed.	Vaccinated.
SS. Canada	Liverpool	May 30	June 7	239	395	262	304	896
S. Montreal	Antwerp	" 27	" 8		113	93	125	206
S. Wittekind	Rotterdam	June 8	" 21	14	593	112	104	719

These vessels were delayed about nine hours at quarantine for landing exposed passengers, having their hospitals and infected compartments thoroughly disinfected, and everybody on board vaccinated. No other cases having broken out amongst passengers detained under observation, these were released upon the expiration of the fourteen days of quarantine now required for smallpox observation.

Typhus.—Two cases of typhus fever were discovered on the following vessels:

Vessel's Name.	From.	Departure.	Arrival.	Passengers and Crew.		
				3rd Class.	Crew.	Landed.
SS. Montezuma	Antwerp	May 20	June 3	84	93	105
SS. Sanland	Rotterdam	June 21	July 2	482	126	18

The delay caused to these vessels for being thoroughly disinfected and having all exposed passengers landed was about seven hours. No other cases broke out amongst people detained under observation, and they were in consequence released after fourteen days' detention.

Hospital.—Five hundred and two persons have been admitted to the hospital. There were eight deaths due to the following diseases: Scarlet fever, one; measles, one; diphtheria, one; pneumonia, one; diphtheria complicating scarlet fever, one; pneumonia complicating scarlet fever, two; enteric fever, one.

We were compelled, as in the previous years, to use tents where to put sicks admitted at the hospital, as we had no sufficient accommodation in the present one to give them.

I may perhaps be permitted to seize that opportunity and ask again that the construction of the new hospital which has been commenced two years ago be completed as soon as possible, as the lack of accommodation in the present one is the cause of many complaints and criticism from the part of people admitted there.

Laboratory Work.—Besides the ordinary experimental work, fifty-one bacteriological examinations have been made as follows:

Diphtheria	8
Typhoid fever	15
Tuberculosis	2
Urinalysis	25
Cholera	1

Rimouski Sub-station.—There was a total of sixty-nine mail steamers inspected by the quarantine officers of this sub-station during the season, and a number of 73,741 persons examined on these vessels as follows:

First cabin	7,176
Second cabin	18,585
Steerage	25,346
Crews	22,634

Infectious disease was discovered on eighteen different occasions, and vessels stopped at Grosse Isle to land sicks and have their hospitals disinfected. Deaths were reported on four occasions, and births on three occasions.

I visited this advance post during the season, and coming up on mail steamer I had full opportunity to supervise the work of inspection from Rimouski to Grosse Isle. I have found everything expedient and satisfactory.

Circular Letters.—Circulars of warning regarding outbreak of infectious disease have been received from time to time and, in accordance with the instructions contained therein, special attention was given to the vessels coming from these different places. I am glad to be able to report here that not a single case escaped the vigilance of your quarantine officers at this station.

Improvements.—The following works have been commenced or completed during the season:—

New iron water tank in western division.
New dynamo shed extension.
New shed to give shelter to immigrants waiting for disinfection.
New addition to hospital kitchen.
New third-class passengers detention building.
Concrete foundations for the new hospital.

Requirements.—The list of works still required at this station has already been submitted to you; but I may specially mention here the most urgent and important ones, such as I have already done in my previous annual reports:—

Construction of a new hospital (foundations already completed).
Extension of wharves.
New steamer fitted as an ice-breaker.
Burying of water-pipes under frost line.

The whole respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

G. E. MARTINEAU, M.D.,
Medical Superintendent of the St. Lawrence Quarantine Service.

APPENDIX No. 3.

N. E. MacKay, M.D., M.R.S.C.

Halifax, N.S., March 31, 1915.

Sir,—I have the honour to submit my annual report for the year ended the 31st March, 1915.

The work at this station during the year just ended was much quieter than it had been in previous years. This was due to the fact that immigration had practically ceased immediately after the declaration of the present war on the 4th of August last.

During the year, 311 vessels were inspected—74 less than the number inspected the previous year—and 65,830 persons classified as follows: Cabin, 2,365; intermediate, 10,064; steerage, 30,439; and forty-six cattlemen; 137,980 less than in the previous year.

Minor quarantinable diseases were found or occurred on the following steamers during the voyage: ss. *Montreal* from Antwerp, April 3, measles; ss. *Andania,* Liverpool, April 5, measles; ss. *Tunisian,* Liverpool, April 7, measles; ss. *Alannia,* Southampton, April 18, measles; ss. *Kursk,* Libau, April 25, scarlet-fever, ss. *Kursk,* Libau, June 6, chicken-pox; ss. *Devinsk,* Libau, June 28, chicken-pox; ss. *Kursk,* Libau, July 18, measles; ss. *Devinsk,* Libau, August 10, measles and diphtheria; ss. *Pretorian,* Liverpool, December 20, scarlet fever; ss. *Corsican,* Liverpool, March 13, scarlet fever.

Diseases other than quarantinable were found on the following steamers: ss. *Arcadia,* Hamburg, pneumonia; ss. *Russia,* Libau, pneumonia; ss. *Aucta,* Fort Antonia, heart disease; ss. *Grampian,* Liverpool, tuberculosis; ss. *Edlington,* Kingston, Jamaica, typhoid fever; ss. *Missanabie,* Liverpool, cerebro-spinal meningitis.

The case of cerebro-spinal meningitis was a military man belonging to the artillery who was in transit from Liverpool to Bermuda. He was taken ill on the 18th of March, three days before the ship arrived in port, but so far as I am able to ascertain no diagnosis was made. On the 22nd of March I performed lumbor-puncture and withdrew two test-tubes full of cerebro-spinal fluid which was cloudy and turbid, and I injected 30 c.c. of Flexner's serum. The man at the time was in a comatose condition. He died the following day, without recovering consciousness. The fluid was examined bacteriologically by my assistant, who found the *Diplococcus meningitidis* of epidemic cerebro-spinal meningitis present.

Twenty patients were admitted to the station hospital during the year for measles, scarlet fever, chicken-pox and epidemic cerebro-spinal meningitis. One death occurred from spinal meningitis.

By permission of the department, and at the request of Mr. J. Scott, Charleston —he guaranteeing to pay all expenses—I attended three cases of small-pox on the steamer *Margaret,* a local coaster. One of the patients died of a virulent type of the disease—*purpura variolasa.*

During the winter the first and second-class detention buildings were occupied by the militia stationed on McNab's and Lawlor's islands.

Alterations were made in the old German hospital in the early winter for quarters for the new hospital orderly, Mr. Robert Thompson, and his family.

All the buildings and plant at the station are in good state of repair, but we need a wash-house in connection with each of the detention buildings, and an ice-house for the use of the station generally. The scarcity of water is a great drawback, and can only be overcome by sinking more surface wells.

All the officials are attending to their duties faithfully and well. All of which is respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

N. E. MACKAY, M.D., M.R.C.S.,
Quarantine Officer.

APPENDIX No. 4.

(R. C. Ruddick, M.D.)

St. John, N.B., March 31, 1915.

Sir,—I have the honour to submit my annual report of the St. John Quarantine Station, for the year ended March 31, 1915.

There have been 204 vessels inspected at this station this year; this is an increase of thirty-one vessels compared with the previous year.

The total number of persons inspected were 19,007, classified as follows: Cabin, 545; intermediate, 2,050; cattlemen, 233; steerage, 5,559; crew, 10,620.

There were admitted to our hospital during the year, 19 persons; five were detained for non-vaccination.

The following diseases were treated: mumps, chicken-pox, and scarlet fever.

Improvements.—Our new first-class detention building has been completed, and is now occupied by the military officers. The new water main has been laid across the channel, connecting it with the city water main at Fort Dufferin, West St. John. This pipe has so far proved very satisfactory. On account of the militia occupying our different buildings, it has been necessary for us to have had extensive plumbing done. We have also had repairs made to our low-water landing, and our telephone service is much improved.

Requirements.—A low-water wharf is very much needed at this station. Since the dredging has been done in the harbour, the current is much stronger here at the island. In rough weather it is very unsafe, and at times impossible to lighter out to our tug. It is impossible to land the sick at low water by means of the lighter. Our tug can only come to the wharf at high tide, and all other times we have to lighter to and from the tug. The want of the wharf necessitates one of the medical officers to be stationed at St. John for the winter season, so as to board incoming vessels from the quarantine boat, at all times. A new house is needed for the medical superintendent, and the house he now occupies given to the steward. The steward's house was condemned three years ago, and is now not fit for a dwelling house. The sanitary conditions are bad, the house is leaking, and in winter is extremely cold.

The militia is now occupying four of our buildings. On account of the small transatlantic passenger travel this winter, we have not required any of the buildings occupied by the militia.

I have the honour to be, sir,
Your obedient servant,

R. C. RUDDICK, M.D.,
Medical Superintendent, St. John, N.B.

APPENDIX No. 5.

(J. Baxter, M.D.)

Chatham, March 31, 1915.

Sir,—For the year ended March 31, I beg leave to send in the following report: Number of vessels examined, thirty-one, viz., nineteen steamers, three barques, seven barquentines, one brigantine, one three-masted schooner. Number of men examined, 579.

No quarantinable disease.

I have the honour to be, sir,
Your most obedient servant,

J. BAXTER.

APPENDIX No. 6.

(Edward Du Vernet, M.D.)

Digby, April 3, 1915.

Sir,—I have the honour to submit my report for the quarantine year ended March 31, 1915. During that period one vessel, with a crew of twenty-six, was inspected at this station, on which was discovered a case of measles.

Owing to business depression and the war, practically no vessels from quarantinable ports entered the Annapolis basin during the year just ended.

I have the honour to be, sir,
Your obedient servant,

E. DuVERNET, M.D.,
Quarantine Officer.

APPENDIX No. 7.

Wm. McK. McLeod, M.D.

North Sydney, C.B., March 31, 1915.

Sir,—I have the honour to forward my report of work at this quarantine station for the year ended March 31, 1915.

During the past twelve months there arrived one hundred and fifty-nine ships, subject to quarantine inspection, classified as follows, viz.:

Sailing ships	8
Steam ships	151
Total	159

Number of persons inspected, 4,499.

Happily no quarantinable disease was found. On January 28, you authorized the use of one of our buildings by the Department of Militia for treatment of a soldier of the Canadian contingent, ill with cerebro-spinal meningitis. He recovered and was duly discharged.

I have the honour to be, sir,
Your obedient servant,

WM. McK. McLEOD, M.D.,
Quarantine Officer.

APPENDIX No. 8.

D. A. Morrison, M.D.

Louisburg, N.S., April 1, 1915.

Sir,—I have the honour to submit my annual report for the year ended March 31, 1915.

During the year I inspected eighty-six vessels, of which eighty-three were steamships and three were sailing vessels. The crews totalled 2,226, and passengers, seven, making a total of persons inspected, 2,233.

No quarantinable disease was found on any of the ships.

I have the honour to be, sir,
Your obedient servant,

D. A. MORRISON, M. D.,
Quarantine Officer.

APPENDIX No. 9.

Peter Conroy, M.D.

Charlottetown, March 31, 1915.

Sir,—I have the honour to submit my report for the year ended March 31, 1915.

There was no quarantinable disease on any vessel inspected at this station during the past year.

There were six inspections of ships from the West Indies and from across the sea.

The number of persons inspected was eighty-five, of whom eighty were crew, and five passengers.

Navigation closed to foreign ships on the 22nd of December. From that date communication with the mainland was kept up by the winter steamers between Georgetown and Pictou.

By consent of the honourable the Minister of Agriculture, the hospital was placed at the disposal of the Marine and Fisheries Department, and was used by them from the 13th day of July till the 3rd day of August, 1914, for the accommodation of a seaman suffering from diphtheria—the Department of Marine bearing all expenses in connection with the case.

On the discharge of the patient, the building was thoroughly disinfected and handed back in good order.

I regret to have to report the death, on the 27th instant, of our boatman, Capt. John Nicholson.

I beg to suggest that in the appointment of a successor, regard be had to the appointee's physical fitness for the work, as well as his freedom from other employments from which he cannot be spared when called upon for continued duty in the quarantine service.

The hospital's requirements are well supplied.

I have the honour to be, sir,
Your obedient servant,

P. CONROY, M.D.,
Inspecting Physician.

APPENDIX No. 10.

SUMMERSIDE, P.E.I.

There was not any quarantinable disease reported from this station.

Dr. A. A. McLellan, the quarantine officer at this port, died on 20th March, 1915.

APPENDIX No. 11.

(H. RUNDLE NELSON.)

WILLIAM HEAD, March 31, 1915.

SIR,—I have the honour to submit my annual report on the conduct of the William Head Quarantine Station, for the year ended March 31, 1915.

Inspections made during the year:

		Compared with preceding year.	
		Increase.	Decrease.
Vessels	154		15
Passengers:—			
Cabin	4,755		1,219
Steerage	11,434		4,998
Crews	15,538		4,973

The effect of the present war conditions on the shipping is interesting:

—	1914-15.	Same period last.
Vessels inspected to outbreak of war on August 4	65	62
Vessels inspected from August 4 to December 8, when the German Pacific fleet was sunk off Falklands	43	60
Vessels inspected from December 8 to March 31	46	47
Total	154	169

It will be seen that before the declaration of war, on August 4, we had an increase of three ships over the same period of the previous year. During the next period of activity of the German Pacific fleet, there was a decrease of seventeen ships, and the next period, after the victory off the Falklands, and the sinking of the *Emden*, a decrease of only one ship. The loss in sailings was accounted for in the following manner, and it is noticeable that no ship billed for this port was captured by the enemy.

Since the outbreak of the war, the last C.P.R. liner to call here was drawn from the regular service on August 14, and it was only on March 21 that we again had any C.P.R. vessel to inspect. These boats were all taken into Admiralty service, as also

one of the Blue Funnel line, on August 4. The Canadian-Australian line is also operating only two vessels instead of three. Allowing for the regular arrival of these vessels, we lost by their absence a total of thirty-five ships, which would have brought our total for the year to an increase of twenty ships over the previous year. A number of colliers, however (seven in all), made their appearance as a result of the war, so that, on the whole, though an increase of twenty may be too high an estimate, I feel sure that we would have shown some considerable increase in our total, as the period before outbreak of war showed to be likely.

Below is a list of persons inspected, other than the passengers and crews of the boats:—

Passage workers	5
Distressed seamen	2
Stowaways	17

A total of one birth, twenty-six deaths, and twenty-four cases of various sickness have been reported at different times throughout the year, as having occurred during voyages.

A case of chickenpox was found on the *ss. Niagara,* which arrived on the 27th April, and all steps were taken to prevent an extension of infection from the case.

During the month of May, Dr. Alfred G. Long acted as assistant medical officer and bacteriologist, and on 17th June, Dr. Chester P. Brown was appointed to fill the position. At the present time he is in Toronto, taking out the necessary work to procure the D.P.H. degree, and should return about the middle of May.

Improvements and new buildings.—The new first-class detention building, of concrete, containing fifty-eight rooms, with accommodation for at least 116 people, has been completed and furnished throughout during the past year.

The assistant medical officer's house has been roofed with slate, and brick veneered, additions have been made to the captain's, chief engineer's, steward's, electrician's, and night watchman's houses.

The laundry and storeroom have also been slate roofed and brick veneered, and an addition made to the storeroom.

The second-class detention building also has been slate roofed and brick veneered.

The C.G.S. *Madge* has had some minor improvements and also a new propellor fitted, which by reducing the revolutions per minute of the engine, and giving a slight increase in speed in miles per hour, should effect some saving in fuel.

The C.G.S. *Gunhild* was purchased as an additional tender and arrived on April 22. She is at present undergoing her annual overhaul.

For the past four months, an additional man has been working as groundsman at the station, having been supplied from the Government Experimental Station at Sidney. He has laid out new lawns, shrubberies, etc., round the new first-class detention building, and also improved the grounds in general by the addition of many trees, flowering shrubs, etc., and the station should in the future be even more beautiful than before.

Darcy Island.—The leper referred to in my last annual report was duly deported on the 13th May, on the Blue Funnel liner *Cyclops.* This man had been in Canada fifteen months, and was found up country, the disease having made its appearance several months after his arrival in the Dominion.

I have the honour to be, sir,

Your obedient servant,

H. RUNDLE NELSON, M.D.,

Medical Superintendent.

APPENDIX No. 12.

(R. L. Fraser, M.D.)

Victoria, B.C., March 31, 1915.

Sir,—I beg to submit my report for the year just ended. Coasting vessels have been exempt from inspection during the year. One deep-sea ship was examined here. No case of infectious or quarantinable disease was found on her.

I have the honour to be, sir,
Your obedient servant,

R. L. FRASER, M.D.,
Quarantine Officer.

APPENDIX No. 13.

(Lachlan N. MacKechnie, M.D.)

Vancouver, March 31, 1915.

Sir,—I beg to submit my report for the year just ended.

As coasting vessels are exempt from quarantine regulations, no inspections were made at this port during the year.

I have the honour to be, sir,
Your obedient servant,

L. N. MacKECHNIE, M.D.,
Quarantine Officer.

APPENDIX No. 14.

(H. Ernest Tremayne, M.D.)

Prince Rupert, April 2, 1915.

Dr. F. Montizambert,
Director General of Public Health,
Ottawa.

Sir,—I have the honour to make my report for the year ended March 31, 1915.

No quarantinable diseases of any kind have arrived at this port.

The site for the third-class detention has been cleared, and plans prepared for the disinfection building. No progress has been made in the matter of water supply for the station.

A much-needed work which was done this spring was the protection work around the Hospital island.

I have the honour to be, sir,
Your obedient servant,

H. ERNEST TREMAYNE,
Quarantine Officer.

APPENDIX No. 15.

(J. A. Langis, M.D.)

Tracadie, N.B., March 31, 1915.

Sir,—I have the honour to submit this, my annual report of the Tracadie Lazaretto, to March 31, 1915.

There are at present sixteen inmates of the institution, seven males and nine females.

There were four deaths during the year, and one new patient was admitted.

Of the inmates, twelve are of French, two of English, one of Icelandic, and one of Russian origin. The ages of the patients vary from eleven to eighty-four years.

Classifying the patients, we have six in the first stage, eight in the second, and two in the third, the final stage.

I have visited the two patients that were sent home three years ago, the disease anaesthetic leprosy, being arrested. They are in perfect health, with not the least spot on them.

The families of a few of our inmates residing in the surrounding parishes I have also visited, and I am pleased to report they are free from the disease.

The treatment followed is with the refined chaulmoogra oil called "antileprol," strychnine, etc., as before. This refined oil, being more digestible, the patients are taking larger doses. It does not impair their digestion in the least, and gives very gratifying results.

One male patient, aged 34, suffering with the maculo-anaesthetic type of leprosy, and whose face was in the condition of fully developed leontiasis, and whose skin was largely infiltrated with nodules and diffused leprous infiltration, is so much improved, his face being only dusky, as to give hopes for his ultimate recovery.

A second patient, male, 42, is able to work from the first month of his taking the oil. He now takes three drachms a day and but for a chronic beratities, which is improving, and two yellow spots on the shoulders, he is on the speedy way to recovery.

A woman patient, aged sixty, an anaesthetic case of leprosy, coming in five months ago, with diseased bones of the hands and feet, and the formation of perforating ulcers on the sole of the feet, has no more open sores after taking this treatment from November last.

With all our inmates who are taking advantage of this treatment, there is a notable improvement and if we cannot cure all, we are doing much in ameliorating their condition.

The few coats of paint, varnish, and general repairs on the inside of the building have added so much to the good appearance of our wards and private rooms, that it seems as if it was healthier, though it is always so trim, clean, and hygienic.

We are expecting for next summer, the repairs at the outside, and our lazaretto will then be more cheerful and present a neat appearance.

Our inmates are truly appreciative to all who are in charge of the institution, and they never let pass an occasion to show their good heart by deeds and sincere thanks.

The good care and kindness the nursing sisters are night and day bestowing on all is a great soothing remedy.

I have the honour to be, sir,
Your obedient servant,

J. A. LANGIS, M.D.,
Medical Superintendent.

APPENDIX No. 16.

(Chas. A. L. Fisher, J.P.)

Montreal, March 31, 1915.

Sir,—I have the honour to submit this my report for the twelve months ended March 31, 1915, as Public Works (Health) Inspector for the territory from Winnipeg east to the Atlantic ocean.

During that period I have personally visited and inspected all such works (in operation) covered by the Public Works (Health) Act, 1899, as have been brought to my notice.

The term has again been an exceptional one, in the almost non-appearance of contagious and infectious diseases among the men employed on the various public works of the Dominion, coming under my inspection.

I am pleased to be able to report again, that on my several tours of inspection of the public works of the Dominion for the past year, I found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

The number of public works coming under the regulations of the Act in my territory, have comprised railway and canal construction, and the Canadian Northern Railway tunnel under the mountain at Montreal.

The following is a detailed report of the works I have personally visited and inspected during the past twelve months:

NATIONAL TRANSCONTINENTAL RAILWAY.

This road is being built by the Dominion Government, and at present all the sections between Winnipeg and Moncton, N.B., have almost been completed.

I am pleased to report that on my visits to the works on uncompleted sections I found, as previously, excellent hospital accommodation provided, and duly qualified physicians as district medical supervisors over each section of camps.

With the exception of some cases of typhoid fever, there had been no outbreak of contagious diseases, and the health of the men had been excellent.

I give below the extent and location of the camps, with other particulars of the works carried on by the various sub-contractors.

Superior Junction Section.—From Superior Junction east for 150 miles. This is under contract to Messrs. O'Brien, Fowler & McDougall Bros., who had their headquarters at Superior Junction, Ont., but are now located in Ottawa.

J. E. Joseph, of Pembroke, Ont., is the chief medical officer for the contractors, and J. M. McGrady, M.D., of Port Arthur, is the medical officer in charge of the work.

Superior Junction Camps.—Three gravel pits operated by the contractors and the Pembroke Contracting Company; also a steel gang operated by the chief contractors.

About 400 men were employed, who were located in three camps, and housed and boarded in log and board dwellings by the contractors, and the steel gang in boarding cars.

There were no cases of contagious diseases, and the health of the men and the sanitary conditions were good. There have been a few minor accidents, but no deaths.

One good hospital was maintained on the work, located towards the east end of the contract. G. E. Denison, M.D., was the medical officer in charge, with John Brandon, M.D., as general medical supervisor.

Missanabie Section.—This is under contract to Messrs. M. P. and J. T. Davis, of Quebec, who have sublet it to Messrs. O'Brien, McDougall & O'Gorman, the contract covering the route from the east end of the Nipigon work, for 150 miles farther east, to the junction of the Abitibi work, under contract to Messrs. E. F. & G. E. Fauquier.

Missanabie Camps.—There were no sub-contractors on this work, and about 300 men employed, who were located in two camps, and housed and boarded in wooden buildings by the contractors. The general health of the men was excellent, and the sanitary condition of the camps was good. There was one hospital on the work in charge of Dr. Kinsey.

A weekly train has been operated on this section, but the work thereon has been closed down for the winter.

Abitibi Section East.—From about 8 miles west of the Abitibi river, crossing easterly for 150 miles. This section is under contract to the Grand Trunk Pacific Construction Company.

About 150 men were employed, who were located along the line in several house cars, and boarded and housed by the contractors

The general health of the men and the sanitary conditions of the camps were good. One excellent hospital was maintained for these camps located at Peter Brown Creek, within easy access to the construction works. D. R. Cameron was the resident medical officer. This work is now about completed, and bi-weekly trains have been operated thereon throughout the winter.

Ontario and Quebec Section.—From the easterly limit of the Abitibi East section, sublet to Messrs. Foley, Welch and Stewart, to a junction with the Quebec West section at Weymontachi, Que., about 250 miles. This work is under direct contract to Messrs. Macdonnel & O'Brien, and entrance thereto is over their other contracts for the Transcontinental, lately completed by them from Hervey Junction, Que. John McCombe, M.D., is the chief medical officer of the work.

Ontario and Quebec Camps.—Messrs. Macdonnell Co., O'Brien & Martin, Shea & Egan are the subcontractors.

About 900 men were employed, who were located along the line in eight camps, and boarded and lodged in wooden buildings by the subcontractors.

There were no deaths nor cases of contagious disease. The general health of the men and the sanitary conditions of the camps were good. Three hospitals were maintained for these camps; No. 1 being located at Parent, near the east end of the work, and No. 2 located at Peter Brown creek, as convenient as possible for the west camps of the work. D. R. Cameron, M.D., L. M. Dawson, M.D., the late Thomas H. Jackson, M.D., and D. B. Kennedy, M.D., who succeeded him, were the district medical officers on the work. The hospitals and all work on this section have been closed down during the winter.

CANADIAN NORTHERN ONTARIO RAILWAY.

Port Arthur Sudbury Section.—This road is being built by Messrs. Mackenzie, Mann & Co., from Port Arthur to Ruel, Ont., a distance of about 550 miles, and when completed is to form part of the Canadian Northern Transcontinental line from the Pacific to the Atlantic oceans.

Messrs. Foley, Welch & Stewart and the Northern Construction Company are the chief contractors. Messrs. Mackenzie & Mackenzie, M.D.'s, are the chief medical officers of all the work, and have their headquarters at Winnipeg.

There were several subcontractors, and about 2,000 men were employed, who were located along the line in good wooden buildings, and boarding cars, and boarded by the contractors and subcontractors.

There were no cases of contagious disease, and only one death, and that from an accident. There were three hospitals located along the line, and the St. Joseph's hospital at Port Arthur, and the General hospital at Sudbury, were used when most convenient. These hospitals were under the supervision of C. H. Burroughs, M.D., who made his headquarters at Sudbury, and he had during the year the following medical officers under him, and who made their headquarters at and resided each at one of the three hospitals on the line, viz., E. M. Ellis, M.D., C. P. Young, M.D., E. Evans, M.D., and W. Wellman, M.D. This work was closed down during the winter.

CANADIAN NORTHERN QUEBEC RAILWAY.

Tunnel under Mount Royal.—This is a part of the work in connection with the Canadian Northern transcontinental railway, to give that road a western entrance into the city of Montreal. Messrs. Mackenzie, Mann & Co., of Toronto, are the chief contractors, and Mr. Sidney F. Brown is the chief engineer in charge of the work.

About 350 men are employed, most of whom live in their own homes, and the balance in houses provided by the contractors.

The men are boarded by the Consolidated Boarding and Supply Company, of Montreal. There have been no contagious diseases, and but one fatal accident, and one death resulting therefrom, the man being crushed by a car.

An emergency hospital is maintained at the West Portal camp.

Doctors Mackenzie and Mackenzie, of Winnipeg, are the chief medical officers, and J. A. Charette, M.D., of Montreal, is the medical officer in charge of the men.

CANADIAN NORTHERN WATERWAYS RAILWAY.

Branch of the Canadian Northern Railway from Norwood, Man., running south-east for about sixty miles. The Northern Construction Company, of Winnipeg, are the chief contractors. There are several subcontractors, and about 500 men were employed, who were housed in tents, and boarded by the various subcontractors. There were three slight cases of typhoid fever, but no serious accidents or deaths. The Sisters' hospital at St. Boniface, Man., was used when necessary. Doctors Mackenzie and Mackenzie, of Winnipeg, were the chief medical officers, and C. A. Mackenzie, M.D., was personally visiting the camps and looking after the sanitary condition of the camps and the welfare of the men. This work was closed down during the winter.

WELLAND SHIP CANAL.

This canal is being constructed by the Dominion Government, and the work is divided into nine sections, but up to the present only tenders for five sections have been called for.

Section No. 1.—This has been let to the Dominion Dredging Company, who have their headquarters at Ottawa. Their main camp is located at Port Weller, Ont. About 350 men are employed, who were housed and boarded in frame buildings by the company. There had been one case of typhoid fever and three deaths: one from typhoid, one from drowning, one from electric shock.

The general sanitary conditions were good, and the health of the men excellent. A camp hospital is maintained at Port Weller, under the charge of an hospital ordinary. John McCombe, D.D., is the chief medical officer of this section, and James J. Benny, M.D., is the district medical officer thereon.

Section No. 2.—This is under contract to the firm of Baldry, Yarburgh, and Hutchinson, Limited, of London, England, and St. Catharines, Ont. There are three subcontractors, viz., Yale & Regan, Hill & Leonard, and Stein & Reade, all of

St. Catharines, Ont. About 400 men were employed, who were housed and boarded in frame buildings by the subcontractors. The health of the men has been excellent, there having been no serious disease, but there was one death from drowning, and four from accident. There is a construction hospital at the camp, under the charge of an hospital ordinary. J. McCombe, M.D., is chief medical officer, and Dr. Benny district medical officer thereon.

Section No. 3.—The Confederation Construction Company, Limited, are the contractors for this section, with their headquarters at Thorold, Ont.

About 500 men were employed, who are housed and boarded in frame buildings, by the Harris Abattoir Company.

There were no cases of contagious disease in the camp, but there were two deaths from accident. The sanitary condition of the camp and the general health of the men was excellent.

A camp hospital is maintained at Thorold, under the charge of an hospital ordinary.

John McCombe, M.D., is the chief medical officer, and Dr. Jas. Benny, district medical officer of this section.

Section No. 4.—A small portion of this section has been sublet, and some work done. Only about fifty men were employed, who were housed and boarded by the subcontractor. Their general health was good, and there was no serious disease or deaths. Dr. McCombe is the chief medical officer of the work, and Dr. Benny district medical officer.

Section No. 5.—This is under contract to the Canadian Dredging Company, who have their headquarters at Midland, Ont. Corbett & Son are the subcontractors for the portion of the work now under construction. There are two camps, one at Allanburg, Ont., and one at Port Robinson, Ont. About 300 men were employed, who were housed and boarded in frame buildings by the subcontractors. The sanitary condition of the camps and the general health of the men were good. There were no serious diseases, and no deaths. There were artesian wells at both camps. There was an emergency hospital at the Allanburg camp, and the Welland County General hospital was used when necessary.

Drs. Colbeck and Streight are chief medical officers, and Kirk Colbeck, M.D., looks personally after the welfare of the men, as district medical officer.

On the above public works, in my territory, during the term reported on, there was an average of 6,200 men employed, with seventeen qualified medical officers, in charge of camp hospitals and camps.

Cases of contagious and infectious disease:—

Typhoid fever	4
Deaths and causes as under—	
Typhoid fever	1
Drowning	2
Electric shock	1
Accidents	7
Total deaths as above	11

In closing this report for the twelve months ended March 31, 1915, I am pleased to again be able to draw your attention to the very great abatement of contagious and infectious diseases, the exceptionally low death-rate, the very good sanitary conditions of the camps, the care given by the companies, contractors, subcontractors, and medical officers, in trying to comply with the requirements of the regulations, and the consequent general healthfulness of the men.

In concluding this report, I beg to again draw your attention to the necessity of amending, with as little delay as possible, the regulations at present applying under the Public Works (Health) Act, 1899.

I have the honour to be, sir,
Your obedient servant,

CHAS. A. L. FISHER,
Public Works Health Inspector.

APPENDIX No. 17.

A. E. Clendenan, M.D.

Edmonton, Alta., March 31, 1915.

Sir,—I have the honour to submit my report for the year ended March 31, 1915, as inspector for Western Canada under the Public Works Health Act. For reasons that are now historic, the volume of public works has very much decreased during the past year. In addition to unprecedented national causes, a normal shrinkage has occurred through the completion of several contracts, notably the Canadian Pacific irrigation between Calgary and Medicine Hat in Alberta, the main line of the Grand Trunk Pacific between Winnipeg, Man., and Prince Rupert, B.C., and the Canadian Northern laid in skeleton track between Edmonton, Alta., and Vancouver, B.C.

General health conditions have been unusually good, no contagious diseases of any importance having occurred except typhoid, which has been distinctly less severe than for a number of years past. The medical staffs have been kept well up to the requirements of the Act, and, on the whole, contractors have not been contentious toward suggestions on sanitation.

The public works mentioned as follows are all that come under the Act in the four western provinces and are given in the order in which each was visited for first inspection during the year. The lessened volume of work has enabled more frequent inspections to be made than in former years.

1. The Hudson Bay railway is under direct construction by the Dominion Government. It extends from The Pas, Man., to Port Nelson on Hudson bay, a distance of 418 miles. J. D. MacArthur and N. Boyd are the chief contractors. The work has been sublet to McMillan Bros., who in turn sublet to station men, with the exception of a limited number of large camps of their own on some of the heavier stations. Track is now laid over one-third of the distance, and grading is completed to mile 280, which is the first crossing of the Nelson river. On the completed graded portion, track is being laid this winter, and supplies are being put along the right of way for 125 miles to finish the grade to Port Nelson next summer. The two large bridges over the Nelson will delay completion of the contract for two years.

During the winter months, about 800 men were employed in ballasting and freighting, and the number reached 2,550 during the summer. Owing to the great preponderance of station men as compared with large camps, the sanitary conditions were somewhat below par but there was no menace to general health on account of their dissemination. Food supplies can be taken into that part of the country only during the winter, and nothing is yet produced locally along the line. The absence of fresh food, particularly vegetables, gave rise to scurvy, and forty-five cases came under the attention of the medical staff. None were serious, and all made a good recovery. Fresh potatoes and onions were carried in on men's backs for the patients. This is the first instance of scurvy on public works. Doctors Orok and Ross, The Pas, are chief medical officers, and their main base hospital has been at The

Pas. Their assistants were: Dr. Hogan, in charge of ballasting and pit gangs on the first 100 miles out from The Pas; Dr. N. F. Orok was with the steel gang in a hospital car; Dr. Hughs was at mile 115; Dr. Pedlow at Thicket Portage (mile 185), with a fourth-year student in residence in the hospital assisting; Dr. Holmes had a hospital at Manitou (mile 243) and an advance post emergency hospital at mile 263, with an orderly in residence. There were sixteen cases of typhoid with three deaths, four deaths from other sickness, four fatal accidents, and three serious ones.

2. Grand Trunk Pacific bridge over South Saskatchewan on the Prince Albert branch line, 33 miles southeast of that city, was completed this year. John Gunn and Sons, of Winnipeg, had the contract for the piers, and the Canadian Bridge Co. for the steel work. The force was seventy men, looked after by Dr. Humphries, of Prince Albert. There were no accidents or sickness of any account.

3. Rogers Pass tunnel on the main line of the Canadian Pacific railway is an 8-mile contract, 3 miles of which are approaches to a main tunnel of 5 miles. This is the largest work of its kind in the West, and will take several years to complete. Two gangs, one at the Glacier to the west and the other at Bear Creek to the east, are kept at a strength of 400 men each. Messrs. Foley, Welsh and Stewart are the contractors, and have constructed the best permanent quarters to be found in Western Canada. The natural water facilities were such that modern house improvements have been installed in both camps. Dr. Ker, of Vancouver, is in charge of medical services, and on the ground are Dr. Gallagher with the base hospital at the west portal, and Dr. Davidson with an emergency hospital at the east portal. An engine is used to transport any but minor cases from the emergency to the base hospital Five cases of typhoid occurred, three deaths from gas and one from falling bank.

4. The Kettle Valley line by the Canadian Pacific Railway was under construction from Princeton to Osprey lake, a distance of 35 miles, and the contractors were Guthrie McDougall & Co., who sublet to Heine & Co., Ivor, Paulson, Blanchard & Co., Alden & Co., Bain & Co., Crooks & Co., Glabin & Bluth. The forces went as high as 800 men, and were attended by Dr. McCaffrey, who used the Princeton General hospital as a base, and kept an emergency hospital on the grade. The camps were very free of sickness. On the same line, work was done from Hope, B.C., to Coquahalla Summit, being a distance of 40 miles. MacArthur Bros. Co., with five camps and 585 men made the grade. In the medical service were Dr. McArthur, with a hospital at mile 3, and Dr. Pettman at mile 32. There occurred two cases of typhoid, one diphtheria, three broken bones, and ten deaths from explosions. This contract was all rock work.

5. The Great Northern Railway, with headquarters in Spokane, Wash., built in British Columbia an extension from Coalmont to Otter Summit, a distance of 25 miles. Guthrie & McDougall were the contractors, and had two subcontractors There were 520 employees under the care of Dr. McCaffrey at the Princeton General hospital, and an orderly in an emergency hospital on the grade. No serious hospital cases were reported.

6. The Kootenay Central, connecting the Crowsnest line at Fort Steele with the main line at Golden, was completed this year by building from mile 46 to 106. Foley, Welsh & Stewart sublet the work to Burns Jordan & Co., who had 425 men in eight camps. There were in all 400 men on Canadian Pacific force work on the ballasting gangs, pit gangs, and small bridge gangs. The men were attended by the nearest local practitioners, who were Dr. Shaw, of Wilmer, and Dr. Cullum as assistant to Drs. King and Green, of Cranbrook, and Dr. Taylor, of Golden. There was the same absence of sickness that has prevailed for the two previous years, with one death from violence.

7. The C.P.R. land irrigation between Calgary and Medicine Hat was completed this year by Grant, Smith & McDonald building the extensive concrete aqueduct work

at McBeth Siding, 4 miles east of Brooks, on which there were 400 employees, and by Janse, McDonald & Co., whose subcontractors were Frank Jackson, and Dukelow and Son, finishing the ditches with sixty men.

Dr. Anderson, of Brooks, using the Medicine Hat General hospital, furnished the medical service under the supervision of Dr. Ker, of Vancouver, B.C.

One case of typhoid, with recovery, is all that occurred. This work for several years past has shown many cases of typhoid. A falling concrete form killed one man.

8. Thirteen miles was added to the Expanse extension of the Canadian Pacific railway in Saskatchewan by Dutton and Timson, with Richards and Milton as subcontractors. They employed 121 men, who were attended by Dr. W. T. O. Welsh, of Expanse, with a hospital at Expanse. No sickness was reported.

9. The Weyburn-Lethbridge line of the Canadian Pacific Railway was extended 25 miles from Foremost to East, Alta., by G. W. Webster and two small subcontractors, with 114 men.

Dr. Fanner, of Bow Island, Alta., with a hospital in the village, was in attendance. The work was finished without any sickness.

10. Coronation to North-West, in Alberta, was continued by the Canadian Pacific railway for 25 miles. It is a branch of the Lacombe-Kerrobert line. Janse Bros., Boomer and Hughes, sublet the work to John Timothy, who in turn sublet to C. E. Sandine, McMillan & Co., Foley Bros., Holmes, Murray & Sharky; 177 men were employed. They were in charge of Dr. Hurlburt, of Coronation. No cases of any serious illness occurred. The contract was completed in December.

11. The Southern Alberta Land Company, on their irrigation canal and ditches in southern Alberta, had in division B, from Retlaw to South Dam, thirteen camps and 502 men, in charge of Dr. A. V. Brown, of Medicine Hat, with a hospital at Medicine Hat. In division C, from Retlaw to Suffield, the contractors were Noehrein and Mannix, with fifty men. Dr. F. W. Diamond was assistant on the field, and located at Champion, Alta.

No contagious diseases were reported, though typhoid had prevailed in the same section for two years previously. This work ceased when the war began.

12. Canadian Northern Railway main line between Edmonton, Alta., and Vancouver, B.C., was under construction more or less throughout the whole distance, the heaviest work being carried on through the Yellowhead pass and down the North Thompson river, and in short sections west of Kamloops. Through the Yellowhead pass was the Canadian Bridge Company, at Snaring river, Graham's tank gangs at Jasper, Dillon's bridge gang at Lucerne, tracklaying gang at Geikie, T. O'Connor bridge gang at Grant Brook, Palmer Bros., and Henning grade camp at Resplendent, and Hogan's tunnel camp at west end of the pass.

Swanson and Co. came next on proceeding west. Turning south from the Fraser river, for nearly 100 miles, Palmer Bros. and Henning held the contract and sublet to many smaller contractors.

On the North Thompson section was Hogan, Parsons, and Twohey Bros.

West of Kamloops was the steel bridge crews and Canadian Northern "force work" gangs. From Ashcroft west, ballasting and pit gangs and a tracklaying gang were operating. Over 1,000 men were engaged. The skeleton track is now laid throughout, but a great deal of construction work remains before this is a commercial road.

Dr. Robert MacKenzie, of Vancouver, B.C., is the chief surgeon. He had engaged on the work Dr. Nivin, of Jasper, Alta., Dr. Briggs, assisted by Dr. Jardine, were located at the crossing of the North Thompson, Dr. Howell at mile 123 north of Kamloops, Dr. J. H. Wilkinson, Kamloops, and Dr. Stewart Ross at Lytton. All of them had satisfactory hospitals at their headquarters.

There were twenty-six cases of typhoid and five deaths from the same disease on the entire line, and sixteen major accidents, with three deaths. Numerous minor injuries were reported but no other contagious diseases.

13. The Grand Trunk Pacific between Winnipeg and Prince Rupert was completed this last autumn, and the last sections in the mountains passed from the construction to the operating department of the company. In the month of August there were still in camp on the line between Jasper, in the Rocky Mountains Park, Alberta, and Prince Rupert, B.C., the following camps: Bates and Rogers, seven camps with 235 men; Canada Bridge Co., at west end of Fraser lake, with forty-five men; Collins and Hamilton, with five camps on concrete pier work and 220 men employed; the G.T.P. had seven ballasting and extra gangs, with 320 men.

The doctors in charge were those who are located at what are to be the permanent divisional points, where each had a hospital. The construction medical service was withdrawing from the work and giving place all along the line to the operating service. It consisted of Dr. Nivin, Jasper, Alta.; Dr. Taylor, McBride, B.C.; Dr. Richardson, Prince George, B.C.; Dr. Stone, Endako, B.C.; Dr. McLean, Smithers, B.C.; Dr. Wrinch, Hazelton, B.C.; Dr. Traynor, Terrace, B.C.; Dr. Eggert, Prince Rupert, B.C.

The contagious disease, in the form of typhoid, which had for two years caused so much sickness from Prince George east to Edson, was limited to eight cases, with two deaths; three fatal accidents were recorded, and numerous minor injuries, with three cases of erysipelas, and a small epidemic of mumps. This improved condition has pertained since my last annual report.

14. The Canadian Northern Railway Company worked for two months last autumn on the Medicine Hat to Hanna branch, just north of Redcliffe. Ten miles of ground were broken, and 300 of the settlers in that district were given employment in three camps under the superintendency of Miller and Turnbull, Wilson and Fralick, and Rumbly and Mann. Dr. Brown, of Redcliffe, was the medical man, and had arrangements with the Medicine Hat General hospital. No sickness was reported.

15. The Dominion Western Railway, with a charter from Coutts at the Alberta-Montana boundary to Calgary, Alta., broke ground for the first time this last fall on 6 miles near Pincher Creek under A. Sangreen, with forty men, and 6 miles just south of Calgary under Frank Jackson, with thirty-five men. Arrangements were made by each of the contractors with Pincher Creek and Calgary hospitals to receive and treat any cases of sickness.

16. J. D. McArthur & Co. have carried on continuous construction during the whole year on the Edmonton, Dunvegan and British Columbia railway. Work was on the section between Sawridge at the east end of Lesser Slave lake, on the east, to the Smoky river, on the west, and on the Peace River Crossing branch, which connects with the main line at Round lake. All the grade was let to station men to the number of 500, with the exception of three camps, which were: J. Boynton, with fifteen men on the Peace River branch; A. MacRae, with seventeen men; and Gustafson and Gardner, with seventy-five men, on the main line east of Round lake. There were also a steel gang of 160 men, and ballast and pit gangs of fifty men each, making a total of 867 employees.

Dr. Farquharson, of Edmonton, is chief of the medical service, and keeps on the line Dr. Gibson with a hospital at Sawridge; and Dr. Watson with a final-year student to assist, at Round lake, where a base hospital is located. Selected cases are forwarded to Edmonton.

Numerous cases of dysentery have been reported, and two typhoids, one death from organic heart lesions, one of epilepsy, and two drowned.

Ten thousand two hundred and twenty is approximately the maximum number at work at any one time during the past year on public works in the four western provinces.

Yours obediently,

A. E. CLENDENAN,

Inspector.

MISCELLANEOUS

EXHIBITIONS.

APPENDIX No. 18.

San Francisco, Cal., April 1, 1915.

Sir,—I have the honour to submit the following report of the operations of the Exhibition Branch of your department for the fiscal year ended March 31, 1915.

From the 1st of April, 1914, until the opening of the Panama Pacific International Exposition, this Commission was engaged in the general work of preparing our participation at the San Francisco fair.

In view of the magnitude of the exposition, and considering the benefit that Canada would derive from an extensive and striking display of her resources, it was thought advisable to erect a building of impressive dimensions and corresponding architectural value, and to increase in the necessary measure our already very important stock of exhibits with new and fresh specimens of the products of the country.

The space allotted to us in the exhibition grounds consists of about 2 acres of land, situated in the area reserved for the palaces of foreign countries and the different states of the American Republic. As this land is made from sand pumped from the adjacent ocean, we were obliged, in order to secure proper foundations, to make use of a large number of piles, and it was also thought necessary, in view of possible earthquakes, to make an unusually strong framework. The building is 330 feet long by 210 feet wide and, with its lateral projections, covers an area of 70,000 square feet. Over two million feet of lumber were employed in its construction. The outside walls are made of an imitation of Italian travertine, which is the material adopted by the Exposition for its general building scheme. Each one of the four faces of the building presents an imposing appearance, which is heightened by huge bronze replicas of the famous lions of Trafalgar Square, adorning the main entrances. The whole edifice is a fine example of neo-Greek architecture.

The internal decoration is, for the greatest part, made of tableaux executed in Canadian grains and grasses, and representing miniature landscapes or scenes of agricultural life in Canada. These have been treated in a very happy manner, and this special style of decoration, which has the merit of uniting practical advertising to ornamental art, is highly commented upon by every one, and no doubt accounts for a good share of the popularity and success of our section.

The Canadian exhibit is composed entirely of the natural products of the country, including agriculture, horticulture, forestry, minerals, fish and game. The water-power section consists especially of a huge coloured panoramic map of Canada and a number of models of power plants supplying the main commercial and industrial centres from coast to coast. The main centres are shown on the map, red cards indicating the localities of some of the larger developed water-powers, and green cards some of the larger power sites as yet undeveloped. A large panorama called "Past and Present" illustrates the march of progress and civilization in Canada. The transportation facilities by railroad and water for the carrying and care of the great Canadian wheat crop, and the easy grades of the Canadian railroads through the Rocky Mountains, in comparison with those of the American railroads, are prominently advertised. Special attention is called to the new route via the Panama Canal,

by which the farmers of Alberta and part of Saskatchewan will be able to ship their grain after navigation is closed in the East. The large panoramas used in connection with these sections required about 500 feet of cloth. A special exhibit of Canadian agricultural grasses has also been scientifically arranged, and includes 180 varieties. Literature, issued by the Federal and Provincial Governments, is given to the public, and the officers of our information bureau are kept constantly busy.

We had started as early as the summer of 1913 to prepare a large quantity of bottled fruit in order to enable us to make a first-class display in this line at San Francisco. This fruit was for the most part prepared in the Niagara district of Ontario and in British Columbia during the years of 1913 and 1914. We also have on exhibit a large quantity of fresh apples, collected in the five apple-producing provinces of Canada. I am glad to report that all the work in connection with this exhibit has been carried out most successfully, and that our fruit section here may well be termed unique.

Our mineralogists were also actively engaged during the whole year of 1914 in collecting new specimens of ores from different mining locations, and I may say that our mineral exhibit is one of the most complete and comprehensive ever shown. It is arranged in a very practical manner, each specimen being classified and the place of its production mentioned.

Notwithstanding delays caused by the rainy season, we were able to complete our building even before the time specified, and it was opened to visitors a couple of weeks before the date fixed for the official opening of the exposition, which took place on the 20th of February last. Since then the Canadian Pavilion has been visited by hundreds of thousands of people, and our methods of exhibiting have appealed so strongly to the California people that already steps are being taken to adopt them at future expositions. The comments of the newspapers and other publications are most complimentary, and Canada has received here an enormous publicity. I beg to quote extracts of a few newspaper articles:—

> The *San Francisco Chronicle,* February 24, 1915: "We want to have people asking, not 'Have you seen the Canadian exhibit?' but 'Have you seen the California exhibit?'" said Frank L. Brown, Exposition director. The Canadian plan is the one we must adopt, said W. J. Dutton, one of the exposition stockholders trustee.
>
> "It was decided to call a meeting of the different county commissioners and of the representatives of the Chambers of Commerce to discuss the proper measures to be taken for the establishment of a permanent State Exhibition Commission to represent all of California at every exposition worth while to be taken up.
>
> "It was suggested that William Hutchison, the Canadian Commissioner, be invited to address the meeting and tell how his Government worked out its present plan. The Canadian Commission own its own exhibits, which represent Canada as a whole, and takes them everywhere."

> The *Palo Alto Times,* March 26: "A valuable lesson for the future will be learned by observing the magnificent success of Canada, and following her plan. Every just and generous Californian will feel like taking off his hat in honour of the success of Canada. Her display is one of the main attractions of the grounds."

> The *Chronicle,* January 31: "Canada has a little the best of the other national exhibitors at the Exposition in that it maintains a permanent Government Exhibition Commission. The result is that the Canadian Commission has an established policy experience, and a fund of exhibits always ready to

show anywhere and at any time. The Commission plays no favourites, and gives place to all the industries and regions of the Dominion, but does no advertising of localities. The Canadian Government makes an exhibit wherever the importance of the occasion and the magnitude of the attendance expected makes it worth while. Practice makes perfect, and to-day Canada stands conspicuously for the effectiveness and artistic finish of her exhibit palace and interior displays. Canada is among the countries whose displays are an artistically aggressive assertion of the sense of national pride."

The *Sacramento Bee,* March 3: "Californians who visit the Panama Pacific Exposition are invited to comment the far-away pre-eminence of the Canadian exhibit."

The *Orville Register,* March 12: "Every local booster in California ought to visit the Canadian building at the Exposition if for nothing but for a visible demonstration that the best local advertising is that which does not advertise the locality at all. Simply as an exploitation of the country and its resources, this Canadian building is incomparably the most skilfully presented exhibit on the grounds."

To sum up, I may say there is no doubt that our participation at this exposition is a splendid advertisement for Canada, and that she will derive a great benefit from it. I am satisfied that our exhibit will have the effect of not only inducing a large number of Americans to settle in Canada, but also of bringing back to our country a great many Canadians now living in the United States.

The whole respectfully submitted.

WM. HUTCHISON,
Canadian Exhibition Commissioner.

APPENDIX No. 19.

IMPORTATION OF DOGS ORDER OF 1914.

(9290)

ORDER OF THE BOARD OF AGRICULTURE AND FISHERIES.

(Dated 23rd October, 1914.)

IMPORTATION OF DOGS ORDER OF 1914.

The Board of Agriculture and Fisheries, by virtue and in exercise of the powers vested in them under the Diseases of Animals Acts, 1894 to 1914, and of every other power enabling them in this behalf, do order, and it is hereby ordered, as followed:

Restriction on Importation of Dogs.

1.—(1) An imported dog, that is to say, a dog brought to Great Britain from any other country, except Ireland, and the Channel Islands, and the Isle of Man, shall not be landed in Great Britain unless its landing is authorized by a license of the board previously obtained, and when landed it shall be subject to the provisions of this order, and to the conditions inserted in any license authorising its landing.

(2) The provisions of this order shall also apply to a dog taken from Great Britain, Ireland, the Channel Islands, or the Isle of Man into any port in any country (except Great Britain, Ireland, the Channel Islands or the Isle of Man), as if the animal were an imported animal, unless it is shown to the satisfaction of the board that the

animal has not been landed in that country and that while on board it has not been allowed to come into contact with any dog or other canine animal from that country, and unless the landing of the animal in Great Britain is authorized by a license of the board previously obtained.

Detention and Isolation of Imported Dogs.

2.—(1) An imported dog shall, for a period of four calendar months after its landing, be detained and isolated at the expense of its owner upon premises in the occupation, or under the control, of a veterinary surgeon, which shall have been previously approved in writing by the board for that purpose, and such premises are in this order referred to as the "place of detention."

(2) During the said period the dog shall not be moved from the place of detention except to another place of detention or to a vessel for exportation, and in either case only with a license of the board authorizing such movement.

(3) This article shall apply to (*a*) an imported dog which is shown to the satisfaction of the board to be a bona fide performing dog or (*b*) an imported dog which is intended to be exported from Great Britain within forty-eight hours after its landing, only so far as its provisions are applied by way of conditions inserted in the license authorizing the landing of the dog.

Conditions of License.

3. The Board may insert in any license granted by them under this order authorizing the landing of an imported dog such conditions as they think necessary or desirable for the following purposes:—

(i) for prescribing and regulating the detention and isolation of the dog so far as the same is not prescribed and regulated by this order;

(ii) for prescribing the person by whom and the premises on which the dog shall be detained and isolated;

(iii) for regulating the movement of the dog to the place of detention, or vessel for exportation, and for prohibiting or regulating its movement during a period of four calendar months after its landing, or until its exportation, as the case may be;

(iv) for prescribing the confinement of the dog in a suitable hamper, crate, box or other receptacle during the movement of the dog by railway, or along a highway or thoroughfare;

(v) for prescribing the mode of isolation of the dog;

(vi) for prescribing the muzzling of the dog;

(vii) for prescribing the notice to be given of the death or loss of the dog, or of any matter arising in connection with the movement, detention, or isolation of the dog and the persons by whom and to whom the notice is to be given; and

(viii) for prescribing the production of a license for inspection by an officer of the board, or police constable, or officer of customs and exercise.

Notice of Detention in case of Illegal Landing.

4.—(1) Where an inspector or other officer of the board, or of a local authority, has reason to believe that a dog has been landed in contravention of this order or of any order hereby revoked, he may give notice to the owner or person in charge of the dog requiring that, within a time specified in such notice, the dog shall be moved (*a*) to a vessel for exportation, or (*b*) to a place of detention for the purpose of detention and isolation in accordance with the provisions of such notice.

(2) Such provisions may be inserted in the notice as the board may think necessary or desirable for any of the purposes mentioned in the preceding article.

(3) The operation of a notice under this article may be terminated by notice to that effect given by an inspector or other officer of the board or of the local authority to the owner or person in charge of the dog, on proof to the satisfaction of the inspector or officer that the dog was not landed in contravention of the said orders, or that four calendar months have expired since its landing.

(4) If the owner or person in charge of the dog, after receipt of such notice, fails to move the dog as required by the notice, he shall be deemed guilty of an offence against the Act of 1894.

5.—(1) If an imported dog is not detained and isolated in conformity with the provisions of this order or of the conditions or provisions of a license or notice issued thereunder, the board, or an inspector or other officer of the board may give notice to such owner or person in charge, requiring him to move the dog to a vessel for exportation within a time specified in such notice.

(2) If the owner or person in charge of the dog, after receipt of such notice, fails to move the dog as required by the notice, he shall be deemed guilty of an offence against the Act of 1894.

Seizure of Dogs in case of Default.

6.—(1) If an imported dog is not detained and isolated as required by this order or by the conditions or provisions of any license or notice thereunder, an inspector of the board may seize the dog, and thereupon the board shall detain and isolate it at the place of detention specified in the license or notice, or any other place of detention selected by them, in accordance with the requirements of this order or the said conditions or provisions, at the expense of the owner of the dog.

(2) If the owner of the dog does not, within ten days after the expiration of the period of detention specified in this order or in the license or notice, claim the said dog from the board and pay them their expenses of detaining and isolating the dog, the board may destroy or otherwise dispose of the dog as they think expedient.

Re-landing prohibited of Imported Dogs moved to Vessels for Exportation.

7. An imported dog which has been moved to a vessel for exportation in accordance with a license or notice under this order shall not be re-landed in Great Britain without a license of the board authorizing such landing.

Regulation of Transhipment of Imported Dogs.

8. An imported dog shall not be transhipped in a port in Great Britain except with the written permission of an officer of the board or of an officer of Customs and Excise.

Proceedings under Customs Acts for Unlawful Landing.

9.—(1) If any person lands or attempts to land a dog in contravention of this order, he shall be liable, under and according to the Customs Acts, to the penalties imposed on persons importing or attempting to import goods the importation whereof is prohibited by or under the Customs Acts, without prejudice to any proceedings against him under the Act of 1894 for an offence against that Act.

(2) The dog in respect whereof the offence is committed shall be forfeited under and according to the Customs Acts in like manner as goods the importation whereof is prohibited by or under the Customs Acts.

Detention of Dogs on Vessels in Port.

10.—(1) Every dog to which this article applies shall at all times while on board a vessel in any port in Great Britain be—

(a) secured to some part of the vessel by a collar and chain and muzzled with a wire cage muzzle, so constructed as to render it impossible for such dog while wearing the same to bite any person or animal, but not so as to prevent such dog from breathing freely or lapping water; or

(*b*) confined in an enclosed part of the vessel from which the dog cannot escape.

(2) If any dog to which this article applies shall die, or be lost from a vessel, in any port in Great Britain, the person in charge of the dog shall forthwith give notice of such death or loss to the board.

(3) The provisions of this article shall apply to every imported dog which is not accompanied by a license issued by the board authorizing the landing of such dog in Great Britain.

Extension of certain Sections of Diseases of Animals Act, 1894.

11. Dogs shall be animals, and rabies shall be a disease, for the purposes of the following sections of the Act of 1894 (namely):—

Section forty-three (*Police*);

Section forty-four (*General Administrative Provisions*);

Section fifty-six (*Proceedings under Customs Acts for unlawful landing or shipping*);

and also for the purposes of all other sections of the said Act containing provisions relative to or consequent on the provisions of those sections and this order, including such sections as to relate to offences and legal proceedings.

Local Authority to Enforce Order.

12. The provisions of this order, except where it is otherwise provided, shall be executed and enforced by the local authority.

Offences.

13.—(1) If a dog is landed or transhipped in contravention of this order, the owner and the charterer and the master of the vessel from which it is landed or transhipped, and the owner of the dog, and the person causing, directing, or permitting the landing or transhipment, and the person landing or transhipping the same, and the consignee or other person receiving or keeping it knowing it to have been landed or transhipped in contravention as aforesaid, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Acts of 1914.

(2) If a dog is moved in contravention of this order, or of the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the person causing, directing, or permitting the movement, and the person moving the dog, and the consignee or other person receiving or keeping it knowing it to have been moved in contravention as aforesaid, and the occupier of the place from which the dog is moved, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894.

(3) If a dog is not kept isolated as required by this order, or by the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the occupier of the place where such dog is detained, and the person failing or neglecting to isolate the dog, shall, each according to and in respect of his own acts, defaults or omissions, be deemed guilty of an offence against the Act of 1894.

(4) If a dog is not secured, muzzled, or confined as required by this order, or by the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the master of any vessel on board which the dog is or has been carried to Great Britain, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894.

Withdrawal of License in cases of Default.

(5) If a person with a view unlawfully to evade or defeat the operation of this order, or of the conditions or provisions of a license or notice thereunder, allows a dog to stray, he shall be deemed guilty of an offense against the Act of 1894.

(6) If the owner or person in charge of a dog fails to give, produce, or do any notice, license, or thing which by this order, or by the conditions or provisions of a license or notice thereunder, he is required to give, produce, or do, he shall be deemed guilty of an offense against the Act of 1894.

Revocation of Order; Existing Licenses.

14.—(1) The Importation of Dogs Order of 1901 is hereby revoked.

(2) A license granted or notice given under the order hereby revoked shall have effect as if it had been granted or given under this order, and may be enforced accordingly; but any such license or notice shall, as from the commencement of this order, be read and have effect as if the period of detention referred to therein were four calendar months instead of six calendar months.

Interpretation.

15. In this order, unless the context otherwise requires,—

"The Board" means the Board of Agriculture and Fisheries;

"The Act of 1894" means the Diseases of Animals Act, 1894;

"Master" includes a person having the charge or command of a vessel:

Other terms have the same meaning as in the Act of 1894.

Commencement.

16. This order shall come into operation on the first day of November, nineteen hundred and fourteen.

Short Title.

17. This order may be cited as the IMPORTATION OF DOGS ORDER OF 1914.

In witness whereof, the Board of Agriculture and Fisheries have hereunto set [L.S.] their official seal, this twenty-third day of October, nineteen hundred and fourteen.

SYDNEY OLIVIER,

Secretary.

DEPARTMENT OF AGRICULTURE

REPORT

OF THE

DAIRY AND COLD STORAGE COMMISSIONER

FOR THE

FISCAL YEAR ENDING MARCH 31

1915

Dairying, Fruit, Extension of Markets and Cold Storage

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY J. DE L. TACHÉ, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1915

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REPORT

OF THE

DAIRY AND COLD STORAGE COMMISSIONER

OTTAWA, March 31, 1915.

To the Honourable

The Minister of Agriculture.

SIR,—I have the honour to submit my report as Dairy and Cold Storage Commissioner in your department for the year ending March 31, 1915.

The appointment of a Fruit Commissioner on May 1, relieved me of responsibility for the Fruit Division and will permit, when the war is over, of some new lines of dairy work being taken up.

VISIT TO GREAT BRITAIN AND SWITZERLAND.

Having been appointed Canadian government delegate to the VI International Dairy Congress, which was held June 8 to 12, at Berne, Switzerland, I sailed from Montreal on May 25 and proceeded direct to Switzerland to take part in that great gathering. As I have already referred to the proceedings of this congress in other publications and at public meetings, I do not propose to deal with the matter further in this report.

On my return to England from the continent, I took advantage of the opportunity to call on many of the leading dairy produce merchants in London, Bristol and Liverpool, for the purpose of discussing with them the outlook for Canadian produce in the markets of the United Kingdom. The time at my

disposal did not permit of a visit to that important centre for Canadian trade, the city of Glasgow, but I had the pleasure of meeting some of the leading Glasgow merchants in London and other places.

The merchants whom I met expressed regret at the decline in the exports of dairy produce from Canada, and were glad to be informed that this country was not likely to drop out of the cheese exporting business, a contingency which they had been led to believe was among the near possibilities.

Canadian cheese has attained a distinct place in the trade of the United Kingdom. It has no real rival. Even the New Zealand article, annually increasing in quantity, does not come into very close competition on account of the opposite seasons. Canadian cheese is the standard for all importations. Very few complaints are heard as to its quality, although serious objection is raised respecting the immaturity of a large proportion of the arrivals. The flimsy character of the boxes is also commented on. This defect becomes all the more noticeable when our cheese is compared with that from New Zealand carried as it is in strong, durable crates.

I accepted an invitation to address the members of the Liverpool Produce Exchange, while in that city, and was thus afforded an opportunity of meeting representatives of most of the firms dealing in Canadian produce.

Cargo Inspectors.

This visit to England gave me an opportunity of looking over the work of the cargo inspectors employed under this branch at London, Liverpool, Bristol, and Glasgow. The Department has been fortunate in securing for these positions most capable and efficient officers who take a deep interest in their work, and whose reports, which come to the office regularly, are of much assistance to us in our efforts to improve the trade in food products with the United Kingdom. All the inspectors are local men who have had experience in the produce or fruit trades at the ports where they are employed, and they have been selected on account of their special fitness for the work which they are entrusted with.

The Cheshire Cheese Industry.

While in England I spent a short time visiting the district where the famous Cheshire cheese is made, and which in its modern character probably competes with the cheaper grades of Canadian cheese more than that from any other source of supply.

The principal centre for the Cheshire cheese industry is Whitchurch in Shropshire. A prominent Glasgow cheese merchant, who operates largely in the district, and who knows Canada well, made the assertion that more cheese is produced within a radius of 30 miles of Whitchurch than there is in the whole of Canada. After visiting a number of farms in parts of Shropshire, Denbigh, Flintshire and Cheshire, I do not feel so much like disputing the statement as I did when I heard it made. On a farm of 90 acres I found 60 cows being milked with individual records as high as 12,000 pounds annually. On this farm,

as on others in the district, the prevailing breed is grade shorthorn. The cheese is all made on the farms, generally by the farmer's wife or daughter. An excellent training is received by the cheesemakers at the Worlestan Dairy Institute near Nantwich.

I have referred to the modern Cheshire cheese. It differs, at least the bulk of it, from the historic type in that it contains more moisture and is made to be put on the market much earlier than formerly. The ruling price is several shillings a cwt. lower than for No. 1 Canadian or English and Scotch Cheddars.

The Work of the Branch, Appointments During the Year.

Apart from the separation of the fruit division, there has not been much change in the organization of the branch during the year.

The chief additions to the staff were in the appointment of Mr. Edwin Smith, B. Sc., to take charge of the pre-cooling and experimental fruit storage warehouse at Grimsby, Ont., Mr. J. F. Singleton as chief inspector of dairy products and Mr. J. E. D. Gareau as inspector of weighing of butter and cheese.

Extension of Markets Division.

The usual services have been maintained during the year, but following the outbreak of war there was more or less disorganization in the work of cargo inspection, on account of the number of regular liners that were requisitioned by the Admiralty.

The iced butter car services were operated by the railways under the guarantee which has been given for a number of years, and about the same number of iced cars for cheese were supplied, on request of the shippers, as in former years. These services have proved of great value to the dairy industry, and the advantage of cool transportation for butter and cheese are now much more fully appreciated by shippers than they were before such facilities were so generally available.

The compilation of farm prices was continued during the year. These prices, with a statement respecting the other work of the division, will be found in appendix II which has been prepared by Mr. W. W. Moore.

Finch and Brome Dairy Stations.

These two establishments have been continued as model factories both in the matter of equipment and in the manner of their operation. They also afford convenient facilities for practical tests of apparatus and investigations or experiments in connection with the manufacture of butter and cheese. Some very useful work has been carried out during the year. The details will be found in the report of the Chief of the Dairy Division, appendix III.

Dairy Herd Records.

By propaganda, and through the actual work of the dairy record centres, the keeping of records of individual cows has been extended during the year. The value of this work is becoming more apparent every year in the increased

average yield of milk, not only in those herds which are regularly tested, but for the country generally. The prominence which has been given to the whole question of herd improvement has resulted in greater attention being given to the selection of sires, and to the care and feeding of cows. Farmers are realizing as never before that a cow cannot be a big producer unless she is well fed, and that feed converted into milk generally finds a better market than it does in its raw state.

An interesting compilation of the milk records has been made by Mr. C. F. Whitley, who has charge of this part of the work (see appendix IV). A glance at these figures will show the necessity for studying the performance of individual cows as a basis for general improvement. The records also show what has been accomplished where intelligent effort has been applied in this direction.

Mr. H. W. Coleman, supervisor of cow testing for Ontario, Mr. J. B. E. Trudel, who fills the same position for Quebec, and Mr. Harvey Mitchell in the Maritime provinces, tell of the progress of the work in their respective territories. (See appendices V, VI, and VII.)

Excess of Water in Butter.

The Dairy Industry Act, 1914, fixes the legal limit of water in butter at 16 per cent. Adding an excess over this limit has been the most common offence under the Act, and a number of convictions have been secured. Violations of this kind may be classed under two heads. First there are butter manufacturers who in their desire to make as large a yield as possible keep so close to the limit that they occasionally overstep it. It must be admitted that in some cases there is evidence of wilful violation. The other class of offender is the dealer who deliberately reworks butter for the purpose of adding water. Some of those who handle low grade butter have been found adding as much as 20 per cent in excess of the legal limit. This is a fairly profitable business, and at the same time a most despicable form of swindling, and requires watching.

The Regulations under the Act prescribe the manner in which "whey" and dairy butter shall be branded. It has taken some time to make dairy butter makers acquainted with the provisions of the law, and the policy so far with respect to farm buttermakers, has been one of education rather than of prosecution.

The experience of a year's administration of the law points to a necessity for further regulations to permit of the seizure of apparatus and material either in cases of persistent offenders, or in cases of the more important violations, such as attempts to manufacture spurious butter or to mix with butter any of the cheaper and inferior vegetable or animal fats. Violations of this kind are happily not numerous. (See details by Inspector Singleton in appendix IX.)

Inspection of Weighing of Butter and Cheese.

Following the report and recommendations of the Commission on the Weighing of Butter and Cheese, Mr. J. E. D. Gareau was appointed to the position of Inspector of Weighing of Butter and Cheese, with headquarters at Montreal. The cheese factory and creamery salesmen were notified that it would be the

Inspector's duty to investigate any complaint regarding the weight of butter or cheese as reported at Montreal. Mr. Gareau gives a brief review of his work in appendix XI.

I am pleased to add that judging by the lack of complaints since Mr. Gareau's appointment his work has been very successful. His findings reported from time to time bear out the conclusion of the Commission that much of the trouble arose from defective scales in use at the factories and because the cheese was often weighed and boxed in a very green condition and several days before it was shipped.

The Pre Cooling and Experimental Fruit Storage Warehouse at Grimbsy, Ont.

The erection of this warehouse was authorized by you during the year 1913-14, and it was nearing completion at the beginning of the year under review. Everything was in readiness at the opening of the fruit season of 1914, with Edwin Smith, B.Sc., in charge.

The season of 1914 was abnormal owing to the complete failure of the peach crop in the Niagara district, but a considerable quantity of other fruit was handled, either for pre-cooling before shipment or for short term storage. There were also received some apples for winter storage.

A good start was also made in the scientific work which has for its object the collection of reliable data as to the best temperature for carrying different kinds of fruit, the proper stage of maturity, the effect of various styles of packing etc.

Mr. Smith gives an account of the season's operations in appendix X.

Cold Storage.

The active cold storage work of the branch has been confined chiefly to the Grimbsy Pre-Cooling and Experimental Fruit Storage Warehouse, which is referred to in another paragraph.

The administration of the Cold Storage Act, under which subsidies are paid for the erection of public cold storage warehouses, is largely a matter of routine which goes on year after year without much change. The same may be said of the payment of bonuses to creameries for the erection of suitable refrigerators.

Plans and specifications for small cold storages are furnished to farmers, grocers, and others who desire to provide themselves with cheap cooling facilities for various products.

No Regulations have yet been made under The Cold Storage Warehouse Act of 1914, and therefore the Act is practically inoperative.

Mr. Jos. Burgess, Cold Storage Inspector, reports on the payment of creamery cold storage bonuses and his work as inspector under the Cold Storage Act will be found in appendix VIII.

Publications.

In addition to the annual report and articles and notes prepared for the Agricultural Gazette, the following bulletins and circulars were issued during the year:

Bulletins.

42. The Dairy Industry Act, 1914, and Regulations.
43. The Cold Storage Act, 1907, as amended in 1909, and Regulations.

Circulars.

11. Revised List of Apple Dealers in Northern Ontario, Manitoba, Saskatchewan, and Alberta.
12. Branding Dairy Butter.

Meetings.

I have personally not been able to attend as many meetings as usual on account of the exacting nature of my duties on behalf of the War Office.

Messrs. Chapais, Barr, Whitley, Burgess, Singleton, Smith, Coleman, Trudel and Mitchell have attended numerous meetings in different parts of the country.

I have pleasure in testifying to the faithful services of the various officers and the clerks at headquarters.

The outside men have, with few exceptions, proved industrious, capable and reliable.

I have the honour to be, sir,

Your obedient servant,

J. A. RUDDICK,

Dairy and Cold Storage Commissioner.

APPENDIX I.

REPORT OF THE ASSISTANT DAIRY COMMISSIONER.

SAINT-DENIS (EN BAS) COUNTY OF KAMOURASKA, QUE.

The present date of March 31, 1915, closes the twenty-fifth year which has elapsed since my appointment as Assistant Dairy Commissioner for the Dominion of Canada. I have thought it fitting at this anniversary to present my annual report under the form of a brief summary of the work which I have done during that lapse of time.

I will first make a short analysis of my last year's work, from April 1,1914, to March 31, 1915.

SUMMARY OF WORK IN 1914-15.

I have done less work than usual in my capacity as Assistant Dairy Commissioner on account of the fact mentioned in my last year's report, that, since August, 1913, to my duties as such have been added those of Assistant Commissioner of Agricultural Instruction for the province of Quebec.

In the provinces of Ontario and Quebec, I have, during the last twelve months, made, in fourteen counties, twenty-four visits in twenty-three localities. I have delivered thirty-nine lectures before 4,470 persons, of whom 207 were butter and cheesemakers. The average attendance at these lectures was 131 persons. I have travelled 5,416 miles to perform my work.

I give here a list of the counties and localities visited, and where I have delivered lectures, with reference letters indicating the purpose for which the meetings were called.

TABLE OF VISITS AND LECTURES.

Counties.	Localities.	Visits.	Lectures.	Letters of Reference.
	Province of Ontario.			
Ottawa	Ottawa city	1	1	a
Toronto	Toronto city	1	—	a
	Province of Quebec.			
Berthier	St. Gabriel de Brandon	1	1	a
Brome	Sutton	1	1	b, e
Compton	Compton	1	1	c
	Paquetteville	1	1	c
	St. Edwidge of Clifton	1	1	c
	St. Henry of East Hereford	1	1	c
	St. Isidore of Auckland	1	1	c
	St. Malo of Auckland	1	1	c
Gaspé	Cape Cove	1	1	c
Jacques Cartier	Macdonald College	1	2	a
	"	—	2	a, d
Kamouraska	Ste. Anne de la Pocatière	1	1	b
	St. Denis	1	1	c
	St. Paschal	1	1	b
Lake St. John	Roberval	1	8	b, e
Montreal	Montreal city	1	1	a
Richmond	Stoke Center	1	1	c
Rouville	Abbotsford	1	1	a
	"	—	1	a, d
Sherbrooke	St. Elie d'Orford	1	1	c
Stanstead	Barford	1	1	c
	Stanstead	1	1	b, e
Two Mountains	La Trappe, Oka	2	5	a, e
15	23	24	39	

Reference letters indicate: (a) Federal and provincial meetings; (b) County and district meetings; (c) Farmers' Club meetings; (d) English lectures; (e) Visits in colleges and schools.

The above table shows that I have attended seven federal and provincial meetings, five county and district meetings, have delivered eleven lectures before Farmers' Clubs, eleven in schools of domestic science, and four lectures in colleges and schools, three of which were delivered in English.

FEDERAL AND PROVINCIAL MEETINGS.

The first provincial meeting attended during the last twelve months was the decennial congress of the Catholic Association of the Young French-Canadians, held at Montreal, on June 29. I read before that congress a paper on "The Land and the Social Duties." The second was the annual convention of the Agricultural Missionaries of the province of Quebec, held at the Central Experimental Farm, Ottawa, on the 15th and 16th of July, before which I read a paper on "A few Laws of Interest to the Farmers." The third one was the summer convention of the Pomological Society of the province of Quebec, held at Abbotsford, Rouville county, on September 10 and 11, at which I delivered a lecture on "Latitude in Relation with Rusticity." The fourth was the annual convention of the Ontario Entomological Society held at Toronto on the 4th and 5th of November. The fifth was a meeting of the Federal French Agricultural lecturers held at La Trappe, Oka, on the 10th and 11th of February, before whom I delivered three lectures on "Patriotism and Production". The sixth was the

annual convention of the Dairymen's Association of the province of Quebec, held at St. Gabriel de Brandon, Berthier county, on March 3 and 4, at which I gave an address entitled "Historical Notes on the Quebec Dairy Syndicates." The seventh was the winter convention of the Quebec Society for the Protection of Plants, held at Macdonald College, on March 11, before which I read a paper on "*Aphrophora Spumaria.*"

COUNTY AND DISTRICT MEETINGS.

I have attended five of these meetings. The first one was at Stanstead, Stanstead county, the second at Sutton, Brome county, and the third one at Roberval, Lake St. John county. In those localities, I gave ten lectures on various topics concerning domestic science, the meetings have been held in the young ladies' domestic science schools. The two other meetings were held, one at Ste. Anne de la Pocatière, and the other at St. Paschal, both in Kamouraska county, the first one being the annual convention of the Kamouraska Co-operative Society, the second one being the annual convention of the Kamouraska County Horticultural Society.

LECTURES BEFORE FARMERS' CLUBS.

The other lectures were delivered, eleven in number, before various farmers' clubs in eleven parishes situated in six counties.

OFFICE WORK.

Besides my usual work as Assistant Dairy Commissioner, such as official reports and correspondence, as well as that called for in the filling of my position as Assistant Commissioner of Agricultural Instruction, I have written for the agricultural press, during the last twelve months, thirty papers, memoranda and articles.

TWENTY-FIVE YEARS OF WORK AS ASSISTANT DAIRY COMMISSIONER.

On the first day of February, 1890, the Federal Government at Ottawa, appointed Prof. James W. Robertson as Dairy Commissioner, and placed him at the head of the newly organized branch of dairying, in connection with the federal Department of Agriculture, with the mission of "ensuring, by way of bulletins, meetings and lectures, the diffusion amongst the agricultural classes of the best and most economical methods of manufacturing butter and cheese, and of feeding cattle so as to attain the best results in the production of milk."

The first of April following, I was appointed as Assistant Dairy Commissioner and entrusted with the task of diffusing the same knowledge amongst the French-speaking population.

It was understood that my work was to be one of organization and education, and I have, during this period of twenty-five years—fourteen years and nine months under Prof. James W. Robertson and ten years and three months under you—made strenuous efforts to give it the greatest possible efficiency. That work consisted in attending: (1) Federal and provincial conventions of dairymen, horticulturists, pomologists, agricultural missionaries, and agricultural societies; (2) county and district conventions such as dairy institutes, farmers' institutes, local dairymen's associations, meetings for the organization of factory

syndicates, of county agricultural co-operative societies; (3) farmers' club meetings; (4) ordinary parish meetings; (5) courses of students of the St. Hyacinthe dairy school; (6) meetings of students in colleges and schools, such as agricultural colleges and schools, domestic science schools, and delivering lectures before most of those gatherings.

Besides that work I have made numerous inspections of cheese and butter factories, cold storage rooms, etc.

PARTICULARS OF LECTURES.

During that period of twenty-five years I have delivered 280 lectures before federal and provincial conventions; 515 before county and district meetings; 809 before farmers' club meetings; 249 before ordinary parish meetings; 1,238 to the students of the St. Hyacinthe Quebec provincial dairy school; 97 before meetings of students in colleges and schools; and I have made 1,021 dairy factory inspections.

The federal and provincial meetings I have attended were held in Ontario and Quebec; the county and district meetings were held in Ontario and Quebec; the farmers' club meetings were held in Quebec; the ordinary locality and parish meetings were held in Prince Edward Island, New Brunswick, Quebec, Ontario, and Manitoba; the meetings in colleges and schools were held in Ontario and Quebec; the factories that I have inspected were in Manitoba and Quebec.

The following figures show all the details pertaining to the delivering of my lectures, in the various provinces of the Dominion:—

Provinces visited.	Counties visited.	Lectures delivered.	English lectures.	Farmers met.	Makers met.	Miles travelled.
5	91	3,632	474	370,840	12,534	1,947,184

The number of counties visited in each province is as follows: Manitoba, four, New Brunswick, eight; Ontario, nine; Prince Edward Island, four; and Quebec, sixty-eight.

The 3,632 lectures were delivered as follows, by provinces.

Manitoba.	New Brunswick.	Ontario.	Prince Edward Island.	Quebec.
43	31	62	9	3,587

Though my work was supposed to be made amongst a French-speaking population, I have had to comply frequently with the wishes expressed, in many mixed meetings, when there were English-speaking persons, by speaking in their language. I have always on these occasions very willingly delivered lectures in English for the convenience of everybody. These English lectures were specially a necessity at the St. Hyacinthe provincial dairy school, in Quebec, where students of both languages came to take the courses in English and in French. The number of lectures thus delivered in English has been 474.

I have made an allusion, above, to meetings held for the organization of factory syndicates, to the courses of students of the St. Hyacinthe dairy school and to meetings in colleges and schools. I wish to make a few remarks on those two points.

FACTORY SYNDICATES.

As to the organization of syndicates, which has been one of the salient points of co-operative dairying in the province of Quebec, I think it is well to say in a few words what that organization was.

The Quebec Dairymen's Association was the first society in the Dominion acting jointly with the Department of Agriculture of Quebec to organize cheese and butter factory syndicates. Through that organization the association endeavoured to obtain from the syndicated factories: first, a constant attention to the testing of the milk of the patrons and to receive from them milk of the best possible quality; second, a scrupulous attention to the general tidiness and cleanliness of the factories; third, a uniform system of book-keeping, sufficient to ensure the accuracy and integrity of the monthly and yearly reports of operations of the syndicated factories. In 1890 there were only three syndicates in Quebec. Their number increased rapidly until, last year, seventy-five were in operation. That organization of syndicates which has, this year, been in existence for twenty-five years, is being put aside to make place for another which is meant to be still more perfect than that one was. Time will tell.

ST. HYACINTHE DAIRY SCHOOL.

The St. Hyacinthe dairy school in Quebec was opened in 1893. During the first three years of its existence, it was under the supervision of the Dominion Dairy Commissioner. From that time to 1907 it has been managed by a board of three directors appointed, one by the Federal Department of Agriculture, one by the Quebec Department of Agriculture, one by the Quebec Dairymen's Association, which had organized it and owned it till 1906. I have represented the Federal Department of Agriculture on that board from 1895 to 1906, and have been the president of the board for many years. Courses are opened at that school and theoretical and practical lectures are given in French and in English. Diplomas are conferred on the makers who qualify themselves to obtain them. I have given some of these lectures to the students from 1895 to 1906.

MEETINGS IN COLLEGES AND SCHOOLS.

I will add a few remarks on a move that was made a few years ago, in the province of Quebec, to give a new direction to the instruction of farmers' sons in the rural schools. For a long time, agronomists, as well as those who deal in rural economy, have studied the very difficult problem of agricultural teaching in schools. As agriculture suffers from want of workers, owing to emigration of country people to town or manufacturing centres and to the aversion shown by farmers' sons for their fathers' station in life, it was hoped that it would be useful to have delivered, in country colleges and high schools, lectures on the advantages offered by agriculture as a career for the young people. The reverend brothers of seven teaching institutes of the province of Quebec, who are at the head of a large number of colleges and schools, asked me to devote a little of my time, while travelling to deliver other lectures, to the delivering of lectures of that kind before their pupils, and I thought I should accede to their wish.

OFFICE WORK.

Through all my travelling, very little time, comparatively, was left me for office work. As I have a very large correspondence, much writing to do to prepare my various lectures, which have all been put in print, and as I have written for the agricultural press, since 1890, over 750 papers, essays, articles, memoranda and reports on various agricultural topics, I may say that I have never felt lonesome for want of work.

CLOSING OF A QUARTER OF A CENTURY'S WORK.

With these few remarks, I finish here my twenty-fifth report which, I hope will meet your approval as showing part of what our branch of the Federal Department of Agriculture has done (as far as I am concerned) for the progress and welfare of the French dairymen and farmers of Canada, during this last quarter of a century.

J. C. CHAPAIS,

Assistant Dairy Commissioner.

APPENDIX II.

REPORT OF THE CHIEF, EXTENSION OF MARKETS DIVISION.

SIR,—I have the honour to present herewith the report of the Extension of Markets Division for the year ending March 31, 1915.

SUPPLIES FOR THE BRITISH ARMY IN FRANCE.

As you are aware, since the first of October, 1914, my time has been almost entirely taken up in assisting you in the purchase and shipment to France of hay and oats for the account of the Imperial Government, and with the supervision of the hay-compressing plant at Montreal. At the time of writing, this work is still going on and as it is impossible for me to give much time to the preparation of this report I have therefore condensed and abbreviated it as much as possible.

REFRIGERATOR CAR SERVICE FOR BUTTER, CHEESE AND FRUIT.

As heretofore, under special arrangement with the railway companies, refrigerator car services were operated during the past season for the carriage of butter to the various market centres in Canada, and for the transportation of cheese and fruit to Montreal and Quebec. The usual number of inspectors were employed at the railroad terminals in Montreal, Quebec, and Halifax, and the services were well maintained by the railroad companies.

THERMOGRAPH RECORDS.

During the past year, 379 records of temperature were obtained in steamers sailing from Montreal and Quebec, and 107 records in steamers sailing from Halifax to ports in Great Britain. These records gave the temperatures in cold storage chambers, cooled air compartments, and in the ordinary holds in which were carried different varieties of fruit, cheese, bacon, meats, etc. Over two thousand copies of these records were made in this office and sent to shippers, steamship companies, and others interested.

FARM PRICES.

In this report will be found a statement showing prices received by farmers for their principal products during each month of the year under review. These prices have been compiled from monthly reports made by dairy recorders who are stationed in various parts of Ontario, Quebec, and the Maritime Provinces, and whose duties require them to visit the farmers in their districts regularly each month. With the exception of the information furnished by each decennial census, no statistics of this character have hitherto been available in Canada.

CARGO INSPECTION SERVICES.

During the past fiscal year the cargo inspection staff has consisted of six men at Montreal and one at Quebec for seven months; four men in Great Britain and one at Halifax the year round.

For several months after the outbreak of war the shipping trade between Canada and Great Britain was disorganized, and during the autumn months there was considerable detention of cargoes at ports in Great Britain, particularly London. The congestion at that port was so great that ships were unable to discharge their cargoes for weeks, and in some cases material damage was caused to perishable products such as apples, cheese, etc. During the winter months there was not much to complain of in this respect, the steamship companies gradually improving their services, and during the coming season it is expected that sailings from Canadian ports will be fairly regular, although tonnage will undoubtedly be scarce and freight rates remain high.

REPORTS OF CARGO INSPECTORS IN GREAT BRITAIN.

Following are the annual reports of the cargo inspectors employed under the direction of this division at London, Liverpool, Glasgow, and Bristol. These reports contain first-hand information respecting the condition of Canadian food products when landed in Great Britain, and information of value to Canadian shippers.

REPORT OF THE LONDON CARGO INSPECTOR.

London, March 31, 1915.

At nearly all the docks under the port of London authority, there have been improvements or extensions, of more or less importance, made during the last year, but at the Surrey Commercial and the Millwall docks, where most of the Canadian imports are discharged, there have been considerable improvements made, and increased accommodation is now in process of erection. At the latter dock the authority has decided to increase the storage capacity by the conversion of some disused covered sidings into a shed suitable for the storage of goods. The area covered will be 115,000 square feet. The dry dock, which was 445 feet long, has been lengthened to 555 feet.

At the Surrey Commercial docks the authority is providing at the Brunswick yard a shed 385 long by 99 feet wide for the Canadian Pacific Railway; a shed covering about 32,000 square feet for the Cunard Company, and two sheds with a combined area of 15,000 square feet for the authority's import and export business.

Cheese.—The cheese received during the year from Canada amounted to 800,000 boxes, this being an increase of about 41,000 on the previous twelve months' total. There have been very few shipments in which the cheese has arrived in heated condition, and generally speaking the stowage has been good. During the time of the landing of the Canadian Expeditionary Force there were shipments in which the cheese became very badly heated consequent upon the long period during which the boxes remained in the holds before discharge.

Taking the season through, there has been an improvement in the condition of the cheese boxes on arrival, and the percentage of broken boxes has been rather lower than during recent years. The proportion of sound boxes and well-boxed cheese still leaves room for very great improvement, but it is well to note that complaints in this respect have been less frequent during the last year. There are certain marks which invariably reach the storage sheds here in first-class condition as to boxes, proving that if the boxes are fitted to the cheese and leave the factory in sound condition, there is nothing to prevent them reaching the consignees in almost as good shape as they leave the senders. There have been no alterations in the usual methods of discharging cheese, the elevator

conveyor which was tried here two seasons ago not having been used this year. There has been great congestion at the docks since November, 1914, but on those steamers carrying cheese, which had cold and cool air chambers, the machinery was invariably kept going while the boat was awaiting a berth, and when the cheese was ultimately landed it was found to be in good condition.

Bacon.—During the latter half of the year bacon has come to hand in greatly increased quantities, and there have been some very fine consignments during recent months. Considering the weight of these cases they have been very well handled, with the minimum of breakage, and at all times repairs are made good in the sheds by competent workmen.

Eggs.—From the end of September to early December large shipments of eggs were received, and these were landed in good condition, the handy size of the case helping to reduce materially the number of broken boxes. The consignees of eggs were few in number, but they expressed themselves as well pleased with the deliveries received and seemed to regard the trade with favour.

Apples.—The results of the apple season now closing have again proved the difficulty of forecasting market movements with any certainty, the most experienced men in the fruit trade having been unable to correctly anticipate the movements which actually took place. Reports to hand in August last indicated very heavy crops of apples in Ontario, Nova Scotia, and the United States, with more than an average crop in England, and the general appearance of things pointed to a glut of apples, with consequent low prices. As a matter of fact, very few Ontario apples reached the London market, but the Nova Scotia arrived here in very good condition and, except for the second and third shipments, there have been no cases in which good prices have not been made. For many years Nova Scotia Gravensteins have not come to hand as clean and sound as this season, while the packing and grading were well done. Consequently, this variety was well received and favourably commented on. The poor prices made here by the early shipments gave no encouragement to shippers in Nova Scotia and, as a result of very small consignments being sent, the market became clear and following deliveries were eagerly sought after at greatly advanced prices. At no subsequent time during the season has there been a real slump in prices, and despite all indications good returns have been well maintained. It is somewhat difficult to understand why shippers should have failed to send Baldwins until late in the season, many large parcels of this variety arriving during February and even March were in wasty condition, and had to be disposed of at a few shillings per barrel. If sent earlier in the season these would have produced a very good return. With all soft varieties, senders would be well advised to err on the side of early shipment rather than late.

Despite the large crop, English apples this season had no great keeping qualities, and since the turn of the year the competition from these has not been very much felt. A feature of the trade has been the small difference in the price of No. 1's and No. 2's from Nova Scotia, about one shilling only having frequently been between them. In "Kings" the smaller apples in many cases made the better price as the No. 1's of this variety were frequently very large.

Owing to transport difficulties, there has not been the usual service of steamers between Halifax and London for the apple trade, and in some cases the boats have not been the best adapted for the purpose, but generally this fruit has been well stowed in the holds, and all possible care taken in unloading.

In addition to the usual routine of work, I have sent, during the summer of 1914, regular cables touching on the prospects of fruit crops here and weather conditions, supplementing these by letters on general market matters.

From September onwards, cables of prices of apples relating to each shipment have been despatched in addition to a periodical resumé of the conditions at London fruit markets. I have also been in communication with prospective buyers of Canadian apples, and sellers of Canadian eggs, and in every case have put the inquirers in the way of getting their requirements met.

Dock Congestion.—The congestion at the docks has been very great since November last, but the Canadian services to the Surrey Commercial docks have not suffered to anything like the extent that shippers to the larger docks have done. Taking everything into consideration consignments of cheese, bacon, and apples arriving at this dock have been subjected to less delay than the average run of produce coming to London by sea.

During the year I have again found the officials of the Port of London Authority ready to extend all possible help, and at the offices and docks of the various shipping companies I have received assistance and consideration at all times.

A. E. Griffith.

REPORT OF THE LIVERPOOL CARGO INSPECTOR.

Liverpool, March 31, 1915.

I beg to submit the following report covering the ports of Liverpool and Manchester.

During the year I have sent reports on cargoes of 307 steamers, forty of which were at Manchester. Owing to the circumstances forced upon us by the war, and the consequent interruption of traffic, more cargoes of some commodities have probably come to these ports than would have come in normal times. On the other hand, shipments of other kinds might have been larger had space on the steamers been available. The New York route has been extensively used, but not always with good results, particularly in the case of fruit. I do not therefore propose to use the figures given in comparison with other years.

Apples.—The receipts of apples from Canada this season were 399,752 barrels and half-barrels and 26,605 boxes. Of this quantity, Nova Scotia supplied 242,855 barrels and half-barrels and 10,513 boxes. The total quantity of apples received at Liverpool from both Canada and the United States was 908,658 barrels and 379,156 boxes.

In the early part of the season, apples came through from Canada in considerable quantities via New York, but as they experienced very warm climatic conditions in transit, and were generally of the soft varieties, they arrived here very much out of condition, and consequently low prices resulted. In some cases, however, better results might have been obtained had a little more care been exercised. For instance, one of the fruit associations sent a parcel here by this route, a considerable portion of which were Greenings. They formed a fair line in the catalogue, but they were stamped with various packers' numbers, all being branded with the name of the association. Some of these numbers opened well packed and in good condition, others exactly the reverse, while some were moderate. All were sold, however, as one lot, depending for the price on the out-turn of the samples which in some cases showed two poor ones, and in others one good and one poor. If they had been properly separated, the better ones would have brought very good prices, and the poorer ones almost certainly the same as already realized.

The greater part of the season has been anything but brilliant in Ontario varieties, but Nova Scotians generally have been good, though too much small fruit has been packed among No. 1's. The shipments of both sections for the last few weeks have been mostly out of condition, chiefly owing to bronzed and spent apples, but also owing to waste, which was to be regretted, as most of the Maine variety have during the same period landed "bronzed and wasty."

As to boxed apples, packers need to keep on improving their style of packing, making them neat and fancy, so as to catch the eye, if they are to compete with the Oregon and Washington varieties. Many Canadian boxes were received here this year with only one (the top) layer papered, and others not papered at all, making them look very common on that account.

There has been no further improvement in the packing of western New York or Virginia apples, but they have kept up to their usual standard, and except in the case of "bronzed parcels" are realizing good prices.

In the matter of investigations of the Liverpool Port Sanitary Authority *re* "San José scale," that authority has not taken any action this season, probably on account of the war with Germany, the country most interested.

Although Mediterranean fruit has in many cases been seriously delayed in landing, owing to congestion at the docks, and in several cases also apples from the United States, in only one case, viz.: the SS. *Georgic*, was there any delay of more than a day in landing apples from Canada.

Pears.—We received during the year, 17 barrels, 37 half-barrels and 4,780 boxes and half-boxes of pears from Canada. Some of the shipments arrived out of condition, having been sent by ordinary stowage on the steamers. In my last report I pointed out that ordinary stowage was the cause of the faulty condition of several of the parcels arriving here last season. The prices realized this season were: Duchess, 3s. 9d., 4s. 3d.; Anjou, 5s. 6d., 6s.; Clairgeau, 4s. 4½d. for sound boxes No. 1's; Duchess, 3s. 6d., 4s. for sound boxes No. 2's.

Peaches.—We have had no peaches from Canada this year. Plums, peaches, grapes, pears, etc., continue to arrive here in splendid condition from Cape Colony, South Africa, and realize good prices.

Cheese.—We have received here from Canada this year 416,758 boxes of cheese, 479 cases, each containing two or three small cheese, and 369 cases of cream cheese in pots. We also had a shipment of 18 kegs and 593 boxes (butter boxes) of skim cheese in crumbs.* The handling of cheese here this season has left much to be desired. One of the causes of this is that strangers have taken the places of many of the regular hands who have gone to the front, and another cause is due to the package itself, and I repeat what I said in my last report in favour of the New Zealand crate. Almost all the merchants and their men here have now become familiar with the crate, and what little difficulties there were in the way of ready opening have been overcome. This package is very favourable also for the easy detection of bad condition or any damage which has been caused in transit. A feature of this year has been the large number of boxes of cheese sent here during the last few months from the United States.

Bacon.—We have had 81,832 cases of bacon and hams from Canada this year, which almost invariably arrived in good condition. At times the handling has been rough owing to the employment of inexperienced men, but the packages are not strong enough for the weight they contain. They require more inside stiffening and, in many cases, tighter packing. Considerable numbers of large cases have arrived here containing several pieces of perished timber, and these invariably give way when the sling is tightened on them, causing breakage.

*The writer probably refers to dried casein. J. A. R.

Butter.—There have been landed here this year, 2,595 boxes and tubs of butter and 56 barrels of butter from Canada. They have in all cases arrived in good condition. A considerable quantity of butter and renovated butter has also arrived here from the United States during the last few months.

Eggs.—I estimate the quantity of eggs landed here from Canada this year at 46,148 cases. More than half of these were not branded "Canadian produce," and it is quite possible that many more may have been Canadian, but as they were not so branded there was no means of discovering their origin. Considerable quantities have also come here in the same steamers as the above, and also via New York from the United States, most of which were branded "U. S. A. produce," the remainder not being distinguished are not counted.

I consider it would be to the advantage of Canadian shippers to brand their shipments as Canadian produce. I am given to understand by buyers from consignees on this side that there is a distinct trade here in Canadian eggs, apart from any other, and that when they have bought Canadian eggs and have been supplied with cases not described as such, they have been very dubious and disappointed, and in several cases have returned them to the importer. One instance of this kind was brought to my notice.

Cases with the stiff sides carry much the best, those with the thin wood sides often opening out when sliding in line down the shute, a method which is by far the best with ordinary care.

Canned apples.—A total of 59,451 cases of canned apples were landed here, about half of them in cardboard boxes, which being kept dry, have stood fairly well.

Other Produce.—There have also been landed here: 185 tierces and 3,585 cases lard; 2,268 frozen hogs; 5,191 cases and sacks of beef loins, chucks, kidneys, tripe, udders, etc.; 226 quarters beef, 3,883 cases frozen poultry; 3,616 cases frozen salmon and halibut; 200 cases frozen fish, various kinds; 137 barrels of tongues, feet, etc.; 1,860 cases turkeys; 24,623 cases of canned meat, chickens, and tongues; 4,714 cases of evaporated apples; 1,681 barrels of dried apples and apple skins; 375 cases canned corn; 5,001 cases canned pears; 12,300 cases canned tomatoes; 1,000 cases canned peas; 75 cases canned beans; 25 cases canned vegetables, besides small consignments of hog casings, hog hair, meat extract, etc.

Increased Cold Storage Facilities.—The cold storage facilities at these ports have been increased during the year.

Dock Congestion.—A word as to the congestion at the docks. In connection with this question, which seems a remarkable one considering the extent of the docks (7 miles long at Liverpool) and the enormous quay space, it must be remembered that of late years motor transport has played a conspicuous part in clearing the quays, by removing quickly large quantities of cargo to the warehouses, to coasting steamers, and also to the manufacturing towns of Lancashire. Great numbers of these motors have been requisitioned by the Government for war service, both at home and abroad, and this, in addition to a great part of the railway service being also required, has led to the shortage of conveyances, and thus in no small measure to the congestion.

As before stated. Canadian produce has not suffered very much as to landing owing to the congestion, but in the case of bacon has been somewhat delayed in delivery.

I have again to thank the officials of the various steamship companies for the assistance given and the courtesies extended during the year.

PHILIP J. GABLER.

REPORT OF THE GLASGOW CARGO INSPECTOR.

GLASGOW, March 31, 1915.

I have much pleasure in submitting my report for the year ending March 31, 1915.

I am unable to procure comparative figures with previous years, but the duties have been carried out on the same lines as before, viz., attending docks on the arrival of steamers, watching the breaking and discharging of cargo (particularly the opening of refrigerator chambers), examining cargo at dock and in stores, attending sales, and sending priced catalogues with reports on each steamer.

I am again sending you a number of letters I have received from some of the principal importers, setting out their views, and which cover most of the points of interest, and which convey useful information.

Cheese.—The year just closed has been exceptional in every way on account of the altered circumstances brought about by the great war, but all Canadian cheese which came to this market found a ready sale at very remunerative prices. The arrivals were uniformly good in quality and quite up to the usual standard, and I have no complaints except in regard to the number of broken boxes, which is still a very large percentage and does certainly detract from the appearance of the cheese on this market. There is no improvement to note in this respect since last year.

Butter.—There have been no arrivals of butter during the season at this port.

Bacon.—Arrivals were still showing a shrinkage in the earlier part of the year, but later receipts showed a considerable increase in quantity, although not too much for this market. The only suggestion made by a large importer here is that the Government should encourage hog raising more than they have ever done before. The condition and quality has been all that could be desired in all arrivals at this port.

Eggs.—Owing to the war, the import of eggs had a revival in our market this year, with very good results, the prices obtained being all over very satisfactory, and the quality and condition of "genuine" Canadian eggs very good. Unfortunately, a large number of States eggs which came forward at the same time were put in competition as Canadian eggs and in some cases injured the good reputation of Canadian eggs with the purchaser. This could be obviated to a great extent by the packers stamping their boxes in plain letters "Canadian produce" and also "box free" as cases of boxes being bought back by some of the smaller merchants and repacked with inferior eggs have been mentioned freely to me. The "box free" stamp will largely put a stop to this.

Apples.—The season just finished has been remarkable in many ways; in fact, the most exceptional season yet experienced. The European war breaking out just at the start gave one the impression that very few if any apples would be required for this side; however, after the markets here got settled down, business generally went along smoothly, and by the middle of September the position was entirely altered, prospects ahead, as I wrote you, for fine first-grade fruit were excellent; in fact, right through the season *good* apples have commanded high prices, especially Baldwins, Greenings, and Golden Russets.

Transport facilities have been rather limited and uncertain, but this fact no doubt contributed in no small measure to a steadying influence on the market.

Canadian fruit generally was very good, with the few exceptions being noted for infringement of Fruit Marks Act. Nearing the end of the season apples affected by frost arriving here had to be realized as quickly as possible, sometimes at very low prices.

Boxed Apples.—I reported last year that improvement in packing would stimulate the demand, and this has been fully borne out this season, for as late as at time of writing, splendid prices are being realized for Washington Winesaps (from 8s. to 9s. per case, according to counts).

Californian Newtowns have been of late, and are at present, arriving in very bad condition, selling in quantities from 6d. to 5s. per case. In some cases large quantities are valueless, overheating having caused the damage.

Nova Scotian Apples.—Nova Scotian apples had a very short season in our market, principally owing to lack of steamers, but generally speaking the fruit was very good. There have not been so many complaints regarding the practice of grading No. 3 quality No. 2. Quite a quantity of No. 3's were sold here, but they appeared to be the discarded No. 1.

I take this opportunity of again expressing my thanks to all the officials of the various lines of steamers for their assistance freely given to me in my work here, and also to the merchants and importers for their unfailing courtesy on all occasions.

JOHN M. MANSON.

REPORT OF THE BRISTOL CARGO INSPECTOR.

BRISTOL, March 31, 1915.

Owing to the war the past year must be looked upon as being one full of events and altering in various ways the conditions of the provision trade in Bristol in common with other ports. Taking from April 1 of last year up to the end of July, the rather dull conditions of the previous year continued on a high basis of values, with moderately sufficient supplies to meet current demands; but the sudden outbreak of war in the beginning of August changed everything and caused a perfect rush on the part of the public to buy up extra quantities of provisions, thus forcing a rapid advance of prices in every direction. Fortunately this was not long lived, and by the middle of September matters had settled down considerably and more moderate prices ruled. During the winter months our large and growing supplies from Russia in bacon, butter, and eggs were cut off, and greater demands from Germany did not permit of a compensating increase from other continental countries, so stocks are much smaller all round at the present time than in any previous year. At the outbreak of the war the Department of Agriculture instituted a weekly census of all stocks of provisions throughout the country; this action was well backed up by the merchants in making careful returns to the inquiries made by the board, which enabled the latter to publish re-assuring and reliable statistics of the food supply of the country. These returns are now issued monthly, and are no doubt a benefit to the trade.

Cheese.—Our imports from Canada for the past year total a little over 234,000 boxes. At the start of the war the prices ran up very high, but subsided again to nearly their previous level about the middle of September, since which time they have slowly risen to the present price of about 93s., and there does not seem much prospect of it getting lower. The condition of the cheese on arrival has been very satisfactory throughout and, according to the reports of various merchants, well up to the standard of Canadian make. There is still no improvement in the boxes.

Stocks of New Zealand cheese are coming along just now slowly, and I understand there is a good improvement in the flavour and make as compared with previous years.

Butter.—Two consignments amounting to over 6,000 boxes arrived here during August under cold storage, and were landed in excellent condition. Like other commodities, stocks are far from abundant, and prices ruling high, the difference between now and August last being as much as nearly 30s. per cwt.

Meats.—Our imports of this show an increase over last year, we having received about 2,000 cases. There is a very big demand for bacon, and supplies from the United States are well kept up, but continental ports show a falling off. German merchants, by all accounts, are buying in much larger quantities, and this, coupled with the risk in transit, all tends to curtail our supplies in this line. The Canadian meat arrived here in good condition, and is frequently commented on as being of excellent quality. The cases are good, but owing to their large size I would again suggest an extra band around the centre for strengthening purposes.

Eggs.—For the first time for some years we received some shipments of eggs, amounting to 4,000 cases. There was a shortage of supplies from the Continent, and also a limited supply of Irish eggs towards the latter part of last year, which brought about a practically prohibitive price and caused merchants to import from Canada. All the cases landed in good order, the eggs being well and carefully packed.

Apples.—In all, we have received nearly 11,000 barrels and 200 boxes, one shipment only being from Nova Scotia. With the exception of one small parcel the bulk were sent through to Cardiff and some to Birmingham. From personal observation at the docks, and also from reports to hand, the various shipments have come along in very good condition, though most of the Golden Russets have been somewhat poor in colour. The supply of Canadian apples to South Wales via this port shows a big falling-off as compared with previous years, the chief source this year having been through Liverpool. In the early part of January very good prices were obtainable for nearly all varieties. Apples in boxes were especially good, being carefully papered and packed, and if this plan of packing for No. 1 grade especially was more universal, there would be a greater demand at better prices.

Pears.—We also received 217 barrels of pears and 37 boxes, which were landed in good condition. Great care had evidently been taken in packing a consignment that came in cold storage per SS. *Georgic*, the barrels having ventilating holes and the pears not too tightly packed. Boxes, however, are much preferable to barrels for pears owing to the fruit getting bruised so readily, with a following tendency to get bad quickly, thereby spoiling what would otherwise be a good sale.

Thermographs.—A number of these were placed on board the various ships and all showed good working results.

Steamship Services.—Just as the Montreal service was in full swing, everything was thrown out of gear and the services to this port thoroughly disorganized owing to the authorities taking over nearly all the ships for Government purposes, so our arrivals of Canadian produce have been at irregular intervals, the number of ships coming to hand being just one-half of any previous year. This, of course, has tended to considerably reduce our imports, which has not been counteracted in the way of increased quantities by the ships that have come to hand.

Since the war started the docks at Avonmouth have become a very important centre both for the military and naval authorities, who commandeered one side of the dock for their use, the other sides being used for general trade, but owing

to the Government monopolizing so much of the railway traffic there is great difficulty in getting the goods away from the dock, which is always in a more or less congested state; but with so many difficulties to contend with, and the multifarious items and details arising out of this huge war, it is marvelous the way the work is being carried on and I think we should be thankful it is no worse.

HORACE E. SHALLIS.

FARM PRICES.

Statement showing prices received by farmers for their principal products during each month beginning with April, 1914, and ending with March, 1915.

BEEF CATTLE.

	April, 1914.	May, 1914.	June, 1914	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914	Nov. 1914.	Dec., 1914	Jan., 1915	Feb., 1915.	Mar., 1915.
Live, per 100 lb.	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Kensington	7.50	7.75	8.00	7.00	7.00	7.50	7.00	6.75		7.00	7.00	
Charlottetown		6.50	7.00	7.00	6.00	6.00	5.50	5.50	5.50	5.50	5.50	5.50
Quebec—												
Shawville	7.25	7.25	7.25	5.75	5.50	5.50	5.50	4.50	4.50	4.75	5.50	5.50
Way's Mills	7.50	7.25	7.50	6.75	6.00	6.25	7.00	7.00	7.00	6.50	7.50	8.50
Ontario—												
Cornwall	7.50	7.50	7.50	7.75	8.25	9.00	7.50	4.50	6.75	7.50	7.50	7.50
Ingersoll	7.50	7.75	7.25	7.00	8.50	8.50	7.50	7.00	6.75	5.50	6.75	6.50
Lang	7.00	7.25	5.00	7.50	7.00	7.00	8.00	7.00	7.00	6.00	5.75	6.25
Listowel	7.50	7.50	8.00	8.00	7.75	8.75	8.00	8.25	7.50	7.50	7.50	7.00
Mallorytown	4.75	6.75	6.00	6.00	6.50	6.00	6.00	5.50	5.75	5.50	6.50	5.50
North Gower	7.75	7.75	8.50		7.75	8.25	7.75	7.50	7.75	8.00	6.75	6.00
Renfrew	7.50		7.00	6.50	5.75	7.50	6.50	4.75	3.50	4.25		
Sunderland	8.50	8.50	8.00	7.75	8.40	8.50	6.50	8.25	8.00	7.00	7.50	6.25
Dressed, per 100 lbs.												
Nova Scotia—												
Brookfield					9.50	11.00	8.00	7.50	7.00	9.00	8.50	8.50
Meteghan River		11.00	11.00	11.00	11.00	12.00	12.00	10.00	10.00	12.00		11.00
Scotsburn	11.00	12.00	12.00	12.00	13.00	9.00	8.00	8.00	8.50		8.00	9.00
New Brunswick—												
St. Joseph		11.00	11.00	11.00	10.25	10.25	10.00	10.00	9.00		8.75	8.75
Quebec—												
Montmagny		11.50	14.00	13.50	15.00	12.00	10.00	10.00	8.50	9.00	11.00	
Ste. Anne de Chicoutimi	12.00	12.00	12.00	12.00	11.00	11.00	7.00	5.00	6.00	6.00	8.50	11.50
St. Hyacinthe		13.00	13.00	13.00	12.50	12.50	12.50	12.00	11.00	10.00	9.50	11.50
St. Jerome	9.50	9.50	9.00	9.00	10.00	11.00	8.00		5.00	7.00	8.00	12.00
St. Raphael			13.00	15.00	15.00	14.00	14.50		14.50	15.00	12.00	14.00

VEAL CALVES.

——	April, 1914.	May, 1914	June, 1914	July, 1914.	Aug., 1914	Sept., 1914.	Oct., 1914	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
Live, per 100 lb.	$	$	$	$	$	$	$	$	$	$	$	$
Quebec—												
Shawville	4.50	4.50	4.50	5.50	5.00	5.00	5.00	4.50	4.75	....	..	4.75
Ontario—												
Avonmore	...	...	6.00	8.00	9.00	9.00	8.00	8.00	8.00	8.00	8.00	7.00
Hallville	...	9.00	7.00	8.00	8.00	8.00	9.00	8.00	8.00	8.00	8.00	8.00
Ingersoll	9.00	8.00	9.25	9.25	9.75	9.50	10.25	8.75	8.50	8.50	7.75	8.50
Listowel	9.00	8.00	7.50	8.00	9.50	10.00	10.00	9.00	..	8.00	9.00	8.50
Malcolmtown	7.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	7.50	6.00	6.50	7.00
Live, per head.												
Nova Scotia—												
Meteghan River	..	6.00	6.00	6.00	8.00	8.00	8.00	7.00	7.00	7.00	..	7.00
New Brunswick—												
St. Joseph	..	8.00	9.00	9.00	8.50	8.50	8.50	8.50	..	..	..	..
Quebec—												
Ste. Anne de Chatelaine	5.00	5.00	..	..	..	..	5.00	5.00	5.00	..	3.00	3.00
St. Aubert	..	5.00	6.00	4.00	7.00	8.00	.....	8.00	7.00	7.00	7.00	..
St. Jerome	3.50	3.00	..	..	5.00	5.00	6.00	5.00	..	..	..	2.50
St. Prosper	..	4.00	5.00	4.00	4.50	5.00	5.00	..	..	....	..	....
Ontario—												
Alexandria	4.00	3.00	6.00	6.50	5.00	5.00	5.00	5.00	5.00	..	6.00	6.00
Lang	7.00	7.00	6.00	6.50	8.00	7.00	8.00	8.00	7.50	7.00	..	..

SHEEP.

—	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914.	Nov. 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
Live, per 100 lbs.	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Kensington	5 50	5 50	5 50	...	5 00	5 00	5 00	5 00	5 00	4 75	5 00	5 50
New Brunswick—												
St. Joseph	...	6 00	...	...	10 00	9 50	9 50	9 25	9 25	...	...	...
Quebec—												
Chawville	5 00	5 00	4 00	4 00	4 00	4 00	4 50	4 00	4 25	4 25	4 50	6 00
Ontario—												
Cornwall	7 00	7 00	7 00	5 00	5 75	5 50	4 75	5 00	5 50	5 50	7 50	7 00
Lang	4 75	4 75	6 00	7 50	6 50	5 00	6 00	6 00	6 50	7 50	6 50	6 00
Mallorytown	4 50	5 00	5 00	5 50	5 50	6 00	5 00	5 50	5 50	8 00	5 50	6 00
Oxford Mills	5 50	5 00	5 00	5 00	5 00	4 50	4 00	4 00	4 00	4 25	5 25	5 00
Renfrew	5 00	...	5 00	3 50	4 00	3 75	3 50	3 50	4 00	...	...	...
Sunderland	5 00	5 00	5 50	5 00	6 25	6 50	5 50	6 50	6 75	4 50	5 00	5 50
Dressed, per 100 lb.												
Quebec—												
Ste. Anne de Chicoutimi	...	...	...	13 00	12 50	...	8 00	7 50	6 00	7 00	9 50	12 00
St. Aubert	...	11 00	12 00	11 00	9 00	11 00	...	11 00	10 00	10 00	8 00	8 00
St. Hyacinthe	...	11 00	11 00	11 00	11 00	12 00	12 00	12 00	11 00	11 00	11 00	13 00
St. Jerome	10 00	10 00	10 00	9 75	12 00	11 00	10 00	10 00	10 00	9 00	8 50	...
St. Raymond	...	...	12 00	12 00	13 00	13 00	10 00	13 00	10 50	12 00	11 00	12 00
Ontario—												
Frankford	6 00	...	...	7 00	5 50	10 00	10 00	9 00	...	...	...	12 00

LAMBS.

	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept. 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
Live, per 100 lb.	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Kensington			5 50	5 50	6 00	7 00	6 75	5 75	6 25	6 00		
Quebec—												
Shawville				6 25	5 25	5 25	6 50	6 75	6 25	6 50	7 00	
Ontario—												
Cornwall				8 00	8 00	7 00	7 25	7 00	7 25	7 50	11 00	11 00
Hallville					5 00	6 50	6 50	6 75	6 75	7 00	7 00	7 00
Listowel	7 00	5 00	8 50	7 00		9 00	7 50	7 00		8 00	8 50	
Mallorytown	5 00	6 00	7 00	7 00	7 00	7 00	7 00	7 00	7 00			
Live, per head.												
Prince Edward Island—												
Charlottetown		4 00	4 50	4 50	6 50	6 00	5 50	5 75	6 00	6 00		
Cornwall		4 00	4 00	4 50	4 50	5 00	5 25	5 25	6 00			
Quebec—												
Ste. Anne de Chicoutimi			3 00	3 25	5 50	3 00	4 00	3 50	4 00			
St. Aubert		4 00	5 00	5 00	5 00	4 50		4 00	4 50	4 50	4 00	4 00
St. Jerome			3 00	3 00	3 50	5 00	4 50	5 50	5 00	4 00		
St. Prosper		5 00		4 00	4 50	5 00	5 00					
St. Raphael			5 50	6 00	6 00	5 00	4 25	4 75	4 25	5 00	5 25	5 00
Ontario—												
Alexandria	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 50		5 50	6 00
Ingersoll	7 75	6 75	7 00	7 75	7 25	7 50	7 75	6 50	6 75	6 00	6 75	8 25
Lang	7 50	7 00	6 00	4 50	7 00	7 00	6 00	7 00	6 75	6 00	6 50	6 00
Renfrew	5 00		4 00	5 00	7 00	6 50		6 50	6 50			

HORSES (3 years old and over), per Head.

—	April, 1914.	May, 1914	June, 1914.	July, 1914.	Aug., 1914.	Sept. 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Charlottetown	200	200	200	200	200	200	200	200	200	200	200	.....
Crapaud	175	160	180	180	180	200	200	200	200	.....	.....	.....
Kensington	180	180	185	200	190	185	175	175	175	175	175	160
Nova Scotia—												
Brookfield	225	225	225	225	225	250	250	250	250	.....	.....	.....
Loch Katrine	.....	.....	.....	175	175	175	150	150	175	175	175	175
Meteghan River	200	200	225	175	175	150	.....	200	175	225	.....	250
Scotsburn	185	175	185	185	175	160	160	160	160	160	165	165
New Brunswick—												
St. Joseph	.....	200	200	200	210	220	220	220	215	.....	200	190
Sussex	.....	225	200	200	200	200	200	175	150	175	150	150
Quebec—												
Montmagny	.....	250	250	250	225	225	222	235	225	225	200	.....
Ste. Anne de Chicoutimi	250	250	250	250	250	260	300	225	225	225	250	225
Ste. Claire	.....	175	175	175	175	175	175	175	175	175	175	200
St. Hyacinthe	.....	175	160	175	160	180	180	170	160	150	150	150
St. Jerome	250	250	225	225	250	225	250	250	250	250	225	225
St. Prosper	200	200	200	175	175	175	175	.....	.....	170	170	175
Shawville	225	200	175	190	190	185	190	175	155	155	155	215
Way's Mills	160	160	160	160	160	160	175	175	185	160	175	185
Ontario—												
Alexandria	130	130	125	125	125	125	125	125	125	.....	125	130
Cornwall	150	150	150	110	150	140	135	100	130	140	135	110
Hallville	.....	130	145	135	145	160	140	120	125	150	125	125
Ingersoll	210	175	185	175	215	210	195	205	190	200	205	215
Lang	140	140	150	150	165	135	145	105	150	155	150	150
Listowel	185	200	185	185	185	200	180	185	185	170	185	165
Mallorytown	165	175	175	175	175	150	160	150	150	150	150	150
Renfrew	170	.....	150	150	175	.....	175	175	160	170	165	185

MILCH COWS (Grade A), per Head.

—	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept. 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Charlottetown	50	55	55	55	55	55	50	50	50	50	55	.....
Nova Scotia—												
Brookfield	60	60	60	60	55	55	45	45	50	.....	.....	.....
Loch Katrine	.....	.....	.....	40	50	50	.....	40	40	55	55	60
Meteghan River	55	50	60	50	50	50	.....	50	50	50	.....	50
New Brunswick—												
Sussex	.....	70	70	70	70	70	70	45	55	55	55	55
Quebec—												
Ste. Anne de Chicoutimi	55	55	55	50	55	60	40	40	35	45	50	65
Ste. Claire	.....	60	75	50	75	75	75	75	75	65	60	60
St. Hyacinthe	.....	60	65	60	50	60	60	70	50	60	60	60
St. Jerome	70	70	70	65	50	60	50	50	55	60	55	75
St. Prosper	60	60	65	45	45	45	40	.....	.....	55	55	60
Shawville	70	65	60	60	60	55	55	60	65	65	60	70
Way's Mills	60	60	65	60	50	50	50	65	65	70	65	65
Ontario—												
Alexandria	70	75	75	75	60	60	65	60	65	.....	60	60
Frankford	.....	65	80	90	75	.....	75	65	.....	.....	.....	75
Ingersoll	110	100	95	95	95	90	90	75	60	70	75	75
Listowel	65	75	65	70	70	65	75	75	75	150	75	85
Mallorytown	75	80	80	75	75	75	75	75	75	80	80	85
North Gower	80	85	90	100	100	100	90	75	75	75	80	85
Renfrew	75	.....	70	85	75	80	70	75	70	80	70	85
Sunderland	100	100	90	90	90	70	90	90	90	65	90	90

NOTE.—Grade A means cows yielding 3,500 pounds and over.

MILCH COWS—(Grade B.)—per Head.

——	Apr. 1914.	May 1914.	June 1914.	July 1914.	Aug. 1914.	Sept. 1914.	Oct. 1914.	Nov. 1914.	Dec. 1914.	Jan. 1915.	Feb. 1915.	Mar. 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Charlottetown	35	40	40	40	40	40	35	35	35	35	35	.....
Nova Scotia—												
Brookfield	40	40	40	40	35	40	35	35	40	.....	.....	.....
Loch Katrine	.....	.....	.....	35	35	35	45	30	35	35	40	40
Meteghan River	30	35	30	40	40	35	.....	35	35	35	.....	35
New Brunswick—												
Sussex		35	35	35	35	35	35	30	30	30	30	30
Quebec—												
Ste. Anne de Chevaltini	40	40	40	45	40	50	30	30	30	35	35	55
Ste. Claire	.....	40	50	40	50	50	45	40	50	40	40	40
St. Hyacinthe	.....	45	45	45	35	45	45	50	35	40	40	40
St. Jerome	50	45	45	40	30	50	40	35	35	40	40	55
St. Prosper	35	35	35	30	30	25	25	.....	.....	30	30	35
Shawville	50	45	40	35	40	40	40	40	40	50	50	50
Way's Mills	45	45	45	40	35	35	35	40	40	50	40	50
Ontario—												
Alexandria	50	50	50	50	45	45	45	60	50	.....	50	50
Frankford	.....	65	70	75	45	40	30	.....	.....	.....	.....	50
Ingersoll	60	60	80	80	90	75	80	65	50	55	65	65
Listowel	50	60	45	50	50	50	50	50	50	50	50	60
Mallorytown	40	60	45	40	40	40	45	45	40	50	55	50
North Gower	60	60	65	50	65	60	60	50	50	55	55	50
Renfrew	.....	.....	.....	65	50	50	50	50	45	55	50	60
Sunderland	85	85	65	60	60	50	60	60	65	50	75	60

NOTE.—Grade B means cows yielding under 3,500 pounds.

WHEAT—per Bushel.

—	Apr. 1914.	May 1914.	June 1914.	July 1914.	Aug. 1914.	Sept. 1914.	Oct. 1914.	Nov. 1914.	Dec. 1914.	Jan. 1915.	Feb. 1915.	Mar. 1915.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Winter.												
Prince Edward Island—												
Kensington	1 00	1 00	1 00	1 00			1 00					
Quebec—												
Shawville	0 80	0 80	0 80	0 85	0 95	0 95	1 00	1 00	1 00	1 00	1 15	1 15
Ontario—												
Avonmore		1 00	1 00	0 99	0 97	1 17	1 07	1 07	1 10	1 20	1 35	1 50
Frankford		1 00	1 00	1 00	1 10		1 10	1 12				1 50
Ingersoll	1 00	1 00	1 00	0 97	1 07	1 07	1 07	1 07	1 09	1 10	1 30	1 53
Lang	1 00	1 00	1 03	1 03	0 95	1 15	1 05	1 07	1 06	1 08	1 60	1 30
Listowel	0 95						1 20	1 00	1 12	1 10	1 40	1 50
Renfrew	0 90		0 85	0 93	1 00	1 00	1 05	1 05	1 00	1 07	1 30	1 35
Sunderland	0 95	0 95	1 00	0 90		1 15	1 10	1 10	1 10	1 15	1 50	1 40
Spring.												
Prince Edward Island—												
Charlottetown	0 95	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	
Nova Scotia—												
Metaghan River	1 75	1 75	1 75	1 50	1 50	1 50		1 25	1 50			1 75
Quebec—												
Ste. Anne de Chicoutimi	1 50	1 50	1 50	1 20			1 50	1 50	1 60	1 60	2 10	2 25
St. Aubert		1 50	1 50			1 50	1 50		1 50	1 50		2 00
Ste. Claire		1 25	1 25				1 25	1 25	1 25	1 50	1 50	
St. Jerome	1 50	1 50	1 50	1 50	1 60	1 20	1 50	1 50	1 25	1 45	2 10	2 25
Shawville	0 85	0 85	0 85	0 92	1 05	1 00	1 05	1 15	1 15	1 15	1 30	1 25
Ontario—												
Alexandria	0 85	0 85	0 95	1 00	1 00	1 00	1 00	1 00	1 00		1 25	1 30
Avonmore		1 00	1 00	0 99	0 97	1 17	1 07	1 07	1 10	1 20	1 35	1 50
Kingston	0 90	0 90				0 97	0 97	1 17	1 17	1 17		
Renfrew	0 93		0 90	0 97	1 00	1 03	0 93	1 05	0 95	1 07	1 30	1 35
Sunderland	0 90	0 90	1 00	0 90	1 05	1 15	1 10	1 10	1 10	1 15	1 50	1 40

OATS—per Bushel (34 lb.)

—	Apr. 1914.	May 1914.	June 1914.	July 1914.	Aug. 1914.	Sept. 1914.	Oct. 1914.	Nov. 1914.	Dec. 1914.	Jan. 1915.	Feb. 1915.	Mar. 1915.
	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.
Prince Edward Island—												
Kensington	36	38	40	40	40	60	52	46	50	50	50	55
Nova Scotia—												
Brookfield	50	50	55	60	60	60	65	60	65	.....	.....	.....
Meaghan River	.....	60	.....	.....	70	65	.....	70	70	80	.....	80
Scotsburn	50	50	55	55	60	.....	.....	60	.....	.....	60	70
New Brunswick—												
St. Joseph	.....	61	64	64	62	68	61	57	57	.....	59	66
Sussex	.....	45	50	50	65	65	50	55	60	60	70	75
Quebec—												
Ste. Anne de Chicoutimi	50	50	50	54	72	68	60	60	70	70	72	72
St. Aubert	.....	53	53	.....	53	68	.....	68	60	60	.....	68
St. Hyacinthe	.....	52	47	47	47	57	57	60	52	52	57	68
St. Jerome	38	40	43	48	53	68	60	55	60	68	68	72
St. Prosper	45	50	50	60	55	50	50	.....	.....	50	65	70
St. Raphael	.....	.....	51	51	51	60	60	51	51	60	60	68
Shawville	47	52	50	47	47	50	43	44	44	46	55	60
Ontario—												
Alexandria	37	40	45	50	50	50	40	42	50	.....	50	75
Frankford	.....	47	50	48	55	.....	50	50	.....	.....	.....	60
Ingersoll	35	43	46	47	53	53	47	53	47	45	53	57
Listowel	40	40	40	50	42	60	50	45	45	45	55	60
Mallorytown	45	45	50	50	55	55	50	50	50	56	60	65
North Gower	40	48	45	45	46	60	55	47	55	52	60	70
Renfrew	47	.....	47	47	50	55	50	50	47	47	57	57
Sunderland	40	45	45	45	50	60	43	50	50	50	60	63

BARLEY—per Bushel.

—	Apr. 1914.	May 1914.	June 1914.	July 1914.	Aug. 1914.	Sept. 1914.	Oct. 1914.	Nov. 1914.	Dec. 1914.	Jan. 1915.	Feb. 1915.	Mar. 1915.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Quebec—												
Ste. Anne de Chicoutimi	0 80	0 80	0 80	.....	.....	.....	.....	.....	.....	.....	1 20	.....
St. Aubert	1 00	1 00	1 00	.....	.....	1 00	.....	1 00	1 00	1 00	1 00	1 00
St. Hyacinthe	.....	0 90	0 80	0 85	0 80	0 85	0 90	0 80	0 80	0 58	0 85	0 90
St. Jerome	.....	.....	.....	.....	1 10	.....	0 80	0 80	0 60	0 68	1 20	.....
Shawville	0 55	0 60	0 55	0 55	0 55	0 55	0 52	0 60	0 60	0 65	0 75	0 75
Ontario—												
Alexandria	0 58	0 60	0 65	0 65	0 65	0 65	0 60	0 65	0 70	.....	0 75	0 80
Cornwall	0 60	0 60	0 60	.....	.....	0 70	0 65	0 65	0 70	0 75	0 80	0 80
Frankford	.....	0 58	0 58	0 55	0 60	.....	0 60	9 65	.....	.....	.....	0 80
Lang	0 60	0 55	0 60	.....	.....	0 65	0 70	0 62	0 70	0 80	0 80	0 83
Listowel	0 48	0 50	0 52	0 54	0 54	0 55	0 55	0 60	0 60	0 60	0 65	0 65
North Gower	0 52	0 58	0 55	0 60	0 60	0 65	0 65	0 65	0 60	0 70	0 75	0 85
Renfrew	0 50	.....	.....	0 50	0 60	0 60	0 70	0 60	0 60	.....	0 70	0 70
Sunderland	0 60	0 60	0 55	0 50	0 65	0 70	0 65	0 66	0 65	0 60	0 80	0 80

SESSIONAL PAPER No. 15a

HAY (Loose—per Ton.)

—	April, 1914	May, 1914	June, 1914	July, 1914	Aug., 1914	Sept., 1914	Oct., 1914	Nov., 1914	Dec., 1914	Jan., 1915	Feb., 1915	Mar., 1915
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Crapaud	11 00	11 00	11 00	12 00	8 00	9 00	9 00	12 00	12 00	.....	.....	.....
Kensington	14 00	14 00	14 00	14 00	10 00	9 00	11 00	12 00	12 00	12 00	12 00	12 50
Nova Scotia—												
Loch Katrine	.....	.....	.....	12 00	12 00	12 00	.....	18 00	16 00	16 00	16 00	16 00
Meteghan River	12 00	11 00	10 00	10 00	10 00	10 00	...	12 00	12 00	12 00	.....	.....
New Brunswick—												
St. Joseph	.....	16 00	16 00	16 00	15 00	10 00	11 00	14 00	14 00	.....	14 00	14 00
Sussex	...	12 00	13 00	12 00	13 00	13 00	13 00	15 00	14 00	14 00	14 50	15 00
Quebec—												
Ste. Anne de Chicoutimi	13 00	14 00	15 00	13 50	17 00	19 50	20 00	15 00	.....	.....	20 00	19 00
St. Hyacinthe	.....	10 00	10 50	12 00	12 00	14 00	15 00	14 00	13 00	14 00	15 00	16 00
St. Jerome	12 00	12 00	12 00	12 50	13 00	19 50	18 00	14 50	19 00	18 00	20 00	18 50
St. Prosper	10 00	12 00	12 00	15 00	15 00	15 00	15 00	.....	.....	12 00	13 00	18 00
St. Raphael	.....	.....	10 00	9 00	11 00	10 00	11 50	13 00	12 00	14 00	13 00	15 00
Shawville	15 50	15 50	14 50	13 50	13 50	14 00	14 00	15 00	14 50	14 50	15 50	14 50
Way's Mills	9 00	10 00	8 50	9 00	10 00	10 00	11 00	12 00	12 00	11 00	14 00	16 50
Ontario—												
Avonmore	.....	14 00	13 50	13 50	13 00	13 00	13 00	13 50	16 00	16 00	17 00	16 00
Cornwall	12 00	12 00	12 00	16 00	16 00	16 00	17 50	18 00	18 00	17 00	18 00	18 00
Hallville	.....	14 00	14 00	13 50	15 00	.....	15 00	14 00	.....	.....	17 00	17 00
Ingersoll	13 00	12 50	12 50	11 50	14 00	13 50	12 75	13 00	13 25	13 25	13 25	15 25
Lang	19 00	19 00	20 00	.....	17 00	19 00	19 50	20 00	20 00	21 00	24 00	25 00
Listowel	16 00	16 00	.....	.....	12 00	12 00	12 00	12 00	12 00	14 00	14 00	15 00
Mallorytown	12 00	16 00	17 00	17 00	15 00	15 00	14 00	13 00	14 00	14 00	16 00	15 00

HAY (Baled)—per Ton.

	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Charlottetown	18 00	19 00	17 00	15 00	16 00	16 00	16 00	16 00	16 00	15 00	15 00	.....
Kensington	15 00	15 00	16 00	16 00				13 00	13 00	13 00	13 00	13 50
Nova Scotia—												
Brookfield	14 00	14 00	16 00		18 00	18 00	18 00	16 00	16 00			
Meteghan River	14 00	13 50	13 00	12 00	12 50	12 50		14 00	15 00	14 50	.....	14 00
New Brunswick—												
St. Joseph		19 00	19 00	19 00	17 00	13 00	16 00	16 00		16 00	16 00	16 00
Sussex		12 00	15 00	15 00	15 00	15 00	15 00	18 00	16 00	16 00	16 50	17 00
Quebec—												
Montmagny		13 00		10 00	12 00	12 00	15 00	14 00	13 00	11 00	14 00	...
Ste. Anne de Chicoutimi	15 00	16 00	17 00	16 50	18 75	21 00	24 00	20 00	15 00	21 00	23 00	22 00
St. Félix		10 00	14 00	14 00	17 00	15 00	12 00	11 00	15 00	13 00	13 00	...
St. Hyacinthe		12 00	12 50	13 00	13 00	15 00	16 00	16 00	14 00	15 00	16 00	18 00
St. Jerome	13 25	13 50	13 50	14 00	15 50	21 00	20 00	15 00	21 00	20 00	23 00	21 00
St. Prosper	12 00	14 00	14 00	16 00	16 00	16 00	16 00	.....	.....	13 50	14 50	20 00
Shawville	16 00	16 00	15 00	14 00	13 00	16 00	15 50	15 50	15 00	15 00	16 00	15 00
Ontario—												
Alexandria	14 00	14 00	14 00	15 00	14 00	14 00	14 00	15 00	15 00		16 00	16 00
Cornwall		15 00	15 00	15 00	14 00	14 50	14 50	15 50	17 50	17 50	20 00	20 00
Ingersoll	14 00	14 50	14 50	12 50	15 25	14 50	14 50	15 00	14 75	14 50	14 75	17 50
Kingston	14 00	15 00	15 00	15 25	16 25	15 50	15 25	.....	14 25	15 00	.....	15 50
Listowel	15 00	15 00	16 00	17 00	16 00	14 00	.....	.....	14 00	16 00	17 00	18 00
Mallorytown	14 00	16 00	19 00	18 00		17 00	16 00	15 00	15 00	16 00	18 00	17 00
Sunderland	16 00	15 00	15 00	16 00	20 00	20 00	19 00	20 00	20 00	20 00	20 00	20 00

POTATOES—per Bushel.

—	April, 1914.	May, 1914	June, 1914.	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914	Nov., 1914	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Kensington	.30	.32	.45	.45		.60	.29	.22	.25	.27	.30	.30
Nova Scotia—												
Brookfield	.50	.50	.60	.80	.80	.80	.50	.50	.50			
Loch Katrine				.60	.70	.70		.45	.45	.45	.45	.40
Meteghan River	.57	.58	.62		.50	.40			.40	.60		.60
New Brunswick—												
Sussex		.50	.50	1 25	1 00	.50	.40	.40	.27	.40	.40	.40
Quebec—												
Ste. Anne de Chicontimi	.50	.50	.50	.75	1 12	1 00	.45	.40	.50	.60	.50	.50
St. Aubert		.55	.55	.40	.50	.31	.33		.25	.25	.25	.30
St. Hyacinthe		.75	.70	.75	.90	.60	.50	.50	.60	.60	.65	.60
St. Jerome	.55	.40	.40	.50	.75	.60		.30	.40	.40	.45	.45
St. Prosper	.50	.50	.50	.60	.50	.40	.40			.50	.50	.50
Shawville	.65	.75	.65	.65	.90	.50	.60	.40	.45	.50	.60	.55
Way's Mills	.35	.45	.50	.50	1 00	.65	.50	.50	.55		.50	.45
Ontario—												
Cornwall	.50	.60	.50	.65	.65	.60	.40	.50	.50	.50	.35	.35
Ingersoll	.80	.85	.85	1 10	.90	.90	.75	.20	.20	.40	.35	.30
Lang	.65	.80	1 00	1 30	1 40	.80	.70	.50	.40	.45	.40	.40
Mallorytown	.80	.80	.80	1 50	1 50	.60	.50	.40	.40	.40	.40	.40
Oxford Mills	.55	.60	.60	.60	.60	.60	.35	.35	.35			
Sunderland	.50	.50	.75	.75	.75	.60	.50	.30	.45	.50	.45	.45

MILK—per 100 lb.

—	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Delivered at Factory.												
Prince Edward Island—												
Charlottetown	1 20	.95	.93	.91	.95½	.98	1 03	1 05	1 08	1 14	1 30	....
Kensington	....	....	1 08	1 08	1 08	1 10	1 10	1 10	....	....	1 08	1 09
Quebec—												
Montmagny	....	....	.75	.80	.90	.9[illegible]	1 20	1 25	1 25	1 25	.....	.....
Ste. Anne de Chicoutimi	....	....	....	1 00	1 12	1 22	1 30	1 35	1 30	....	.....	.....
Ste. Claire	....	.95	.95	1 00	1 02	1 0[illegible]	1 25	1 32	1 30	....	.....	.....
St. Hyacinthe	....	.80	.82	1 00	.98	1 10	1 05	1 20	1 20	1 20	.....	.....
St. Jerome	....	.82	1 03	1 05	.99	1 27	1 30	1 36	1 21	1 31	1 38	.....
St. Prosper	1 00	.90	.76	1 00	1 18	1 23	1 25	.....	....	1 40	1 40	1 20
Ontario—												
Alexandria	....	.90	1 08	1 10	1 15	1 15	1 20	1 40	1 50	....	.....	.....
Frankford	....	1 00	.93	1 00	1 00	....	1 15	1 15	....	....	.....	.....
Hallville	....	.99	.96	....	1 03	1 00	1 16	1 28	1 40	1 50	1 50	1 10
Ingersoll	1 05	1 00	1 00	.98	1 06	1 09	1 15	1 12	1 25	1 33	1 37	1 53
Lang	1 40	1 30	1 00	1 03	1 00	1 25	1 20	1 25	1 10	1 50	1 50	1 40
Mallorytown	1 00	1 00	1 00	1 00	1 00	1 15	1 30	1 45	1 40	1 50	1 45	1 40
Sold Direct.												
New Brunswick—												
Sussex	....	1 65	1 65	1 65	1 45	1 45	1 45	1 59	1 59	1 59	1 59	1 59
Quebec—												
St. Hyacinthe	.....	2 00	1 50	1 50	1 50	1 60	1 60	2 00	2 00	2 00	2 00	2 00
Ontario—												
Alexandria	2 00	1 50	1 20	1 20	1 30	1 30	1 35	1 60	1 60	....	1 85	1 85
Cornwall	1 85	1 80	1 80	....	....	....	....	2 20	2 15	2 15	2 20	2 20
Ingersoll	1 30	1 27	1 10	1 10	1 23	1 30	1 35	1 60	....	1 37	1 60	1 60
Kingston	....	....	....	1 20	1 30	1 20	2 80	1 75	1 60	1 75	.....	1 85
Lang	1 40	1 40	1 40	1 40	....	....	1 50	.....	1 50	1 58	.....	1 40

CREAM—per Lb. Fat.

—	April, 1914	May, 1914	June, 1914	July, 1914	Aug., 1914	Sept., 1914	Oct., 1914	Nov., 1914	Dec., 1914	Jan., 1915	Feb., 1915	Mar., 1915
Delivered at Factory.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.
Prince Edward Island—												
Kensington	.....	.....	27	27	26½	27	29	29	29	28	27	29½
Nova Scotia—												
Brookfield	29	31	27	27	27	27	27	30	30		.....	.....
Meteghan River	.....	28	26	25½	25½	26½	.....	28	30		.....	.....
Scotsburn	32	31	27½	24¾	24½	25½	28¼	.....	31½		.....	.....
New Brunswick—												
Sussex	.....	30½	26½	25½	25¼	26½	30	30	30	30	33½	33½
Quebec—												
St. Aubert	30½	25	24	24½	27	.....	.....	31	33	33	32	32½
Ontario—												
Cornwall	.....	30	30	29	28	35	35	36	.....	.....	33	35
Frankford	30	.....	21	23	25	.....	30	31	.....	.....	.....	.....
Lang	29	25	24	25	25	28	30	28	29	30	32	30
Listowel	29	27	24	24	22	24	27	25	29	30	32	31
Kingston	31	.....	25	26	.....	31	33	35	36	.....	37	.....
Oxford Mills	31	28	23	.....	.....	31	.....	.....	.....	.....	35	33
Renfrew	31	.....	25	23½	23	32	27	29½	30½	29	27½	31
Sold Direct.												
Prince Edward Island—												
Charlottetown	.....	24	24	24	24	24	27	27	27	27	27	.....
Nova Scotia—												
Brookfield	40	.....	40	40	40	40	40	45	45	.....	.....	.....
Quebec—												
St. Hyacinthe	.....	40	36	36	36	44	44	44	36	36	36	36
Ontario—												
Alexandria	27	24	24	25	25	24	27	28	28	.....	28	30
Cornwall	45	35	35	35	35	35	45	38	38	38	45	45
Mallorytown	28	25	25	25	27½	35	37	38	36	38	38	38

BUTTER—per Pound.

—	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug. 1914.	Sept. 1914.	Oct., 1914.	Nov. 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	c.	c.	c	c.	c.	c.	c.	c.	c.	c.	c.	c.
Prince Edward Island—												
Charlottetown	27½	25	24	24	26	27½	28	28½	28½	30	31½	..
Nova Scotia—												
Brookfield	25	25	20	22	22	22	25	26	28	.....	.....	...
Lake Ratrige			...	19	20	22	23		27½	27½	27½	25½
Meaghan River	25	25	22	20	20	20		25	25	25	.....	25
New Brunswick—												
St. Joseph		24	22	22	20	23	24	26	27	.....	28	24
Sussex		25	21	21	21	22½	25	26	26	26	26	26
Quebec—												
Ste. Anne de Chicoutimi	27	27	27	28	30	32	28	26	28	28	35	40
St. Antoine		20	18	20	20	24		22	22	22	22	25
St. Hyacinthe		25	23	25	25	28	27	28	27	30	30	32
St. Jerome	22	25	25	25	25	33	26	25	25	28	35	35
St. Raphael			23	22	20	30	28	28	26	25	25	25
Shawville	28	25	25	23½	25½	28	27	30	28	29	30	27½
Way's Mills	30	25	25	23½	25½	28	27	30	28	29	30	27½
Ontario—												
Alexandria	25	27	26	27	28	28	30	32	30	....	30	35
Frankford		28	25	25	35		33	30	.....	.....	.....	35
Ingersoll	31	25½	20½	24½	.....	29	27	27	28	27½	28½	32
Lang	32	25	25	25	28	30½	30	30	30	30	32	35
Listowel	25	25	21	22	24	25	26	27	25	25	28	30
Mallorytown	25	25	25	28	28	30	32	33	30	32	35	33
Oxford Mills	25	19	22	20	23	25	30	28	26	25	26	26
Renfrew	27½	33	21	22½	21	28	27	26½	25	25	29	27½
Sunderland	24½	19½	20	19	23	26	28	28	27	25	28	28

EGGS—per Dozen.

	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug. 1914.	Sept., 1914.	Oct., 1914.	Nov., 1914.	Dec., 1914.	Jan., 1915.	Feb., 1915.	Mar., 1915.
	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.
Prince Edward Island—												
Cornwall	20	18	18	20	21	22	23	24	30			
Nova Scotia—												
Brookfield	18	20	20	18	22	22	25	26	24			
Merigomish River	18	14	15	18	25	28		27	30	22		18
Scotsburn	17	18	19	20	20	22	24	29	30		30	25
New Brunswick—												
St. Joseph		18	18	18	20	22	24	25	30		35	30
Quebec—												
Montmagny		23	18	20	26	30	30	30	40	40	35	
St. Anne de Colombier	30	27	27	25	30	30	40	35	40	40	40	40
Ste. Claire		20	20	20	23	25	30	30	40	40	35	35
St. Hyacinthe		25	22	25	24	25	32	35	40	50	45	30
St. Jerome	20	25	20	20	25	25	30	30	40	35	40	35
St. Prosper	25	20		25	25	25	30			35	28	25
Shawville		23	18	20	26	30	30	30	40	40	35	
Way's Mills	30	20	20	20	25	30	30	32	45	50	25	17
Ontario—												
Avonmore		20	18	19	20	25	25	27	30	35	30	27
Ingersoll	20	23	19½	21	23	22½	25	30	37½	39	34½	26
Lang	18	19	22	22	22	24	30	35	40	45	32	23
Listowel	24	23	20	19	18	23	23	27	30	40	35	30
Mallorytown	20	20	20	22	23	24	27	45	45	40	28	18
Oxford Mills	18	19	22	19	20	22	25	28	30	35	35	25
Renfrew	25		18	18	20	25	25	27½	20	40	32	28

CHICKENS—(Dressed)—per Lb.

—	April, 1914.	May, 1914.	June, 1914.	July, 1914.	Aug., 1914.	Sept., 1914.	Oct., 1914.	Nov., 1914	Dec., 1914.	Jan., 1915	Feb., 1915	Mar., 1915.
	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.
Prince Edward Island—												
Kensington	12	12	12	12	12½	13	12	13	13	13	13	13
Nova Scotia—												
Brookfield	18	18	15	15	18	18	20	18	17	..	.....	.....
Loch Katrine	....	....	.....	13	15	15	15	13	13½	13½	13½	.....
Meteghan River	18	.....	.....	14	14	14	.....	15	14	15	.....	15
New Brunswick—												
Sussex	.....	19	16	15	22	22	18	16	15	18	18	18
Quebec—												
Montmagny	.....	20	20	20	20	20	20	18	18	18	15	..
St. Hyacinthe	.....	20	20	20	22	24	22	20	17	17	16	17
St. Raphael	....	....	.....	20	30	25	18	14	13	12	12	12
Shawville	.....	.....	.....	.....	17	16	17	14½	14	15	15	.....
Ontario—												
Alexandria	12	12	12	20	12	12	12	11½	.....	10	.....	12
Cornwall	12	.....	17	18	25	18	15	11½	16	16	17	17
Ingersoll	15	16½	19½	17½	16½	16½	16	13	10½	12½	15½	15
Lang	17	17	20	20	20	20	15	15	16	15	18	20
Mallorytown	15	16	16	18	18	16	16	15	14	16	15	16
Sunderland	18½	19	22	.....	25	20	16	15	13	14½	17	15

APPLES—Per Bushel.

—	April. 1914.	May. 1914.	June. 1914.	July. 1914.	Aug. 1914.	Sept. 1914.	Oct. 1914.	Nov. 1914.	Dec. 1914.	Jan. 1915.	Feb. 1915.	Mar. 1915.
	$	$	$	$	$	$	$	$	$	$	$	$
Prince Edward Island—												
Kensington	0 70	0 70	.....	.....	..	0 60	0 40	0 40	0 40	0 45	0 65	0 70
Nova Scotia—												
Meteghan River	1 00	0 83	0 85		0 75	0 75	..	..	....	0 75	.....	0 75
New Brunswick—												
Sussex	...	1 00	0 85	0 83		0 75	0 75	.....	.....	0 75	.....	0 75
Quebec—												
St. Prosper	..	.....	.....	1 25	1 00	1 00	1 00	..	..	1 25	1 50	..
Ontario—												
Alexandria	....	.....	.....	.....	1 20	1 20	1 00	1 00	1 00	...	1 25	1 75
Ingersoll	....	.....	.....	0 75	0 55	0 35	0 25	0 30	0 50	0 50	0 50	0 55
Kingston	1 50	..	.....	.....	1 25	1 25	1 00	0 75	0 75	..	..	1 35
Lang	1 70	1 80	...	.....	0 75	0 50	0 80	0 70	0 65	1 00	0 90	0 75
North Gower	....	..	.....	.....	..	0 50	1 00	0 75	1 25	1 00	1 25	1 50

W. W. MOORE,

Chief, Extension of Markets Division.

OTTAWA, March 31, 1915.

APPENDIX III.

REPORT OF THE CHIEF OF THE DAIRY DIVISION.

FINCH DAIRY STATION.

The following is a statement of the business from January 1 to December 31, 1914.

Total milk received	2,356,202 pounds.
Total cheese manufactured	131,906 "
Total butter manufactured	21,247 "
Total milk shipped	60,800 "
Total cream shipped	14,407 "
Total paid to patrons	$28,108 74

During January and February the entire output was shipped to Montreal as milk and cream. From March 1 to May 13, part of the cream was shipped to Montreal and part made into butter. From May 14 to November 30, the output was principally cheese, with a small quantity of butter and occasional shipments of milk and cream. During December part of the cream was shipped and part made into butter.

The average price paid the patrons per 100 pounds of milk each month was as follows:—

January	$ 1 72	July	$ 1 07
February	1 67	August	1 15
March	1 19	September	1 34
April	0 98	October	1 44
May	1 04	November	1 44
June	1 04	December	1 61

Average for the year, $1.19 3-10.

The average per cent of fat in the milk delivered from March 1 to October 31 was 3·45. This is almost ·10 per cent higher than for the same period in 1913. As all the milk is now paid for according to the Babcock test, the patrons are taking a keen interest in the question of keeping up or increasing the percentage of fat in the milk.

Milk Supply.

During the summer months, milk was received from fifty-three herds. In addition to these, in the late fall and winter months fifty-one patrons from neighbouring factories sent their milk. The manager, Mr. B. A. Reddick, endeavoured to get accurate figures as to the number of cows in each herd among the regular patrons sending milk six months in the year. This was obtained from thirty-seven herds containing 469 cows. These cows averaged 3,581 pounds of milk, and the average money received was $41.81 per cow. The best herd (twenty-four cows) averaged 6,285 pounds of milk and $74.83 per cow.

Shrinkage in Milk Supply.

Careful experiments show that when cows receive an abundant supply of succulent feed during the summer months, they will shrink about 10 per cent per month after they reach their full flow of milk, which is usually in June in

the Finch section. Only twenty-two herds contained the same number of cows in June, July, and August. The total number of cows in these herds was 285. These cows showed a shrinkage of 17·7 per cent in July and a further shrinkage of 25·6 per cent in August, or a total loss in these two months of 42,462 pounds of milk over a 10 per cent shrinkage. It is reasonable to assume that this loss could have been prevented by providing suitable soiling crops for feeding the cows during the above months.

Encouraging features of the work at the Finch Dairy Station are the increase in the quantity of the milk being produced during the winter months, when the prices are high, and the growing interest that is being taken in cow testing. One hundred and fifty-five cows were under test during the year. The use of pure-bred bulls is also increasing.

BROME CREAMERY.

The following is a statement of the business from January 1 to December 31, 1914.

Pounds milk received at Brome creamery	994,738
Pounds milk received at Brome Centre skimming station	409,750
Pounds milk received at Owen's Corner skimming station	496,580
Total pounds milk received	1,901,068
Pounds cream received at Brome creamery	78,236
Pounds cream received at Brome Centre skimming station	10,413
Pounds cream received at Owen's Corner skimming station	1,287
Total pounds cream received	89,936
Total pounds butter-fat in cream and milk received	93,067
Total pounds butter manufactured	107,644
Total pounds cream sold	18,626
Total fat in cream sold	7,514
Total paid patrons at Brome creamery	$ 16,255 06
Total paid patrons at Brome Centre skimming station	4,931 99
Total paid patrons at Owen's Corner skimming station	4,790 80
	$ 25,977 85
Average pounds of milk to make 1 pound butter	22·5
Average price paid the patrons per 100 pounds of milk	$ 1.11 7-10
Average price paid the patrons per 1 pound fat	27 9-10

Milk Supply.

Milk and cream were received from fifty-four herds. It was found difficult, however, to get the number of cows in all the herds; therefore, the following figures are estimated on only forty-four herds, containing 686 cows.

The average butter-fat per cow was 117·2 pounds, and the average money paid the patrons per cow was $32.77. The highest herd average (seventeen cows) was 173·42 pounds butter-fat, and $47.54 per cow.

Shrinkage in Milk Supply.

The highest flow of milk in the Brome section was in July. Only thirty-seven herds contained the same number of cows in July and August. The total number of cows in these herds was 473. These cows showed a shrinkage of 35·2 per cent in the month of August, which equalled 1,233 pounds of butter-fat.

Here again as at Finch we can reasonably assume that this loss could have been prevented by providing suitable soiling crops. Better feeding and a more general use of pure-bred bulls are the outstanding requirements of the district as far as dairying is concerned.

EXPERIMENTAL WORK AT FINCH. PAYING FOR MILK ACCORDING TO ITS CHEESE-PRODUCING VALUE.

To divide the proceeds from the sale of cheese accurately among the patrons of a cheese factory, each patron's milk would have to be made up into cheese separately. This, of course, is not practicable. It is, therefore, necessary to adopt some other method of dividing the money. In the early days of cheese-making, there was no practical method of testing the milk from different herds to ascertain its cheesemaking value; a hundred pounds of milk from one herd was considered equally as good for making cheese as that from any other, so the method of paying each patron the same price per hundred pounds of milk was adopted. The introduction of the Babcock test, however, gave a simple and practical method of determining the percentage of butter-fat in the milk, and it was found from experiments and regular factory work that when the fat in the milk increased, the yield of cheese increased also. Although it is now over twenty-five years since the Babcock test was introduced, and we have known all that time that one hundred pounds of 4 per cent milk will make more cheese than one hundred pounds of 3 per cent milk, we still find a large majority of the cheese factories in Canada paying the patrons the same price per hundred pounds of milk. No small amount of experimental work bearing on this subject has been carried out at the Agricultural Colleges and Experimental Stations in both the United States and Canada, and it was with a view to emphasize what has already been done rather than with the expectation of throwing new light on the subject that the Dairy Division attempted some further work along this line.

In 1913 the staff of the Dairy Division at the Finch station, after considerable testing of milk with the Hart casein tester, found that it was difficult to get reliable results under ordinary factory conditions. A continuation of the work in 1914 gave the same results. The Walker casein test was tried with better success, and it was used in making the tests for casein in the experiments herein recorded. The cheese were made as carefully as possible in two small vats, and the results can be considered fairly accurate for one season's work. All the cheese were tested for moisture when two weeks old by the Dominion Chemist, Dr. Frank T. Shutt, Experimental Farm, Ottawa.

It is impossible to make cheese from day to day with exactly the same percentage of moisture, and to make an accurate comparison of the quantity of cheese made from milks containing different percentages of fat and casein, all the cheese should contain the same percentage of moisture.

The figures given in the following tables are based on 35 per cent moisture in all the cheese.

TABLE I.—Showing Pounds Cheese per 100 pounds Milk, per Pound Fat, per Pound Casein, and per Pound Fat and Casein with Cheese Equal in Moisture Content (35 per cent).

Date of Making.	Pounds Milk.	Per cent Fat in Milk.	Per cent Casein in Milk.	Pounds Cheese with 35 per cent Moisture.	Pounds Cheese per 100 pounds Milk.	Pounds Cheese per one pound Fat.	Pounds Cheese per one pound Casein.	Pounds Cheese per pound Fat and Casein.
June 24	386	3·10	2·10	32·00	8·29	2·67	3·95	1·59
July 16	341	3·10	2·30	29·05	8·52	2·79	3·64	1·57
" 9	437	3·15	2·45	38·16	8·73	2·77	3·56	1·56
" 24	445	3·20	2·30	38·42	8·63	2·69	3·75	1·57
" 1	358	3·25	2·00	32·61	9·10	2·80	4·55	1·73
June 5	823	3·30	2·40	76·32	9·27	2·81	3·87	1·63
July 17	477	3·30	2·40	43·23	9·06	2·74	3·77	1·59
June 19	800	3·40	2·60	76·52	9·56	2·81	3·67	1·59
" 25	694	3·40	2·30	63·53	9·15	2·69	3·98	1·60
July 1	386	3·40	2·00	36·15	9·36	2·75	4·68	1·73
" 24	365	3·40	2·50	31·71	8·68	2·55	3·47	1·47
" 10	414	3·50	2·45	39·51	9·54	2·72	3·89	1·60
June 11	750	3·55	2·45	71·93	9·59	2·70	3·89	1·59
July 17	457	3·65	2·40	42·63	9·32	2·55	3·88	1·54
June 11	750	3·70	2·40	74·44	9·92	2·68	4·11	1·62
" 18	805	3·80	2·50	82·23	10·21	2·69	4·09	1·62
" 4	817	4·00	2·60	87·83	10·75	2·68	4·14	1·62
July 30	400	4·00	2·35	41·98	10·49	2·62	4·46	1·65
Totals and averages.	9,905	3·492	2·395	938·25	9·478	2·712	3·954	1·60

The following points are interesting in Table I:—

(1) The yield of cheese from 100 pounds of milk varies from 8·29 pounds to 10·75 pounds, or nearly 2·5 pounds more cheese from 100 pounds of 4 per cent milk than from 100 pounds of 3·1 per cent milk.

(2) The yield of cheese per pound fat varies from 2·55 pounds to 2·81 pounds just about one-quarter of a pound.

(3) The yield of cheese per pound casein varies from 3·47 pounds to 4·68 pounds, almost 1¼ pound.

(4) The yield of cheese per pound fat and casein, added together, varies from 1·47 to 1·73 pounds, or exactly the same variation as in the pounds of cheese per pound of fat.

It may also be noted that the pounds of cheese per pound of fat, tends to decrease as the fat in the milk increases; while the pounds of cheese per pound of casein, and per pound of fat and casein, tends to increase as the per cent of fat in the milk increases.

Table III contains a mass of figures, but is exceedingly interesting and should be carefully studied by both factory men and patrons, as it shows the value of 100 pounds of milk calculated by the different methods herein mentioned for paying for milk made into cheese. The fat and casein basis of payment is the actual amount of fat and casein in the milk as shown by the Babcock test and the Walker casein test. Straight fat is figured from the fat test only.[1] Straight casein is figured from the casein test as shown by the Walker casein test. Fat + 2 means that the factor 2 was added to the reading of the Babcock test; for instance, 3·1 per cent is recorded as 5·1. Fat + calculated casein is the Babcock test with a sum added as shown in Table II, which will be found on page 278 of "Practical Cheesemaking," by Van Slyke and Publow.

[1] So far as the writer knows, no one has ever advocated paying for cheese milk by the straight casein test, and these figures show that the method need not be considered.

TABLE II.

Per Cent of Fat in Milk.	Dividend Number.	Per Cent of Fat in Milk.	Dividend Number.
3·00	5·10	3·55	5·87
3·05	5·17	3·60	5·94
3·10	5·24	3·65	6·01
3·15	5·31	3·70	6·08
3·20	5·38	3·75	6·15
3·25	5·45	3·80	6·22
3·30	5·52	3·85	6·29
3·35	5·59	3·90	6·36
3·40	5·66	3·95	6·43
3·45	5·73	4·00	6·50
3·50	5·80	4·05	6·57

Pooling is dividing the total money among the patrons at the same rate per 100 pounds of milk. The cheese is valued at 10 cents per pound.

TABLE III.—Showing different methods of paying for cheese milk. Cheese with equal moisture content 35 per cent and valued at 10 cents per pound.

Fat in milk.	Casein in milk.	Value of 100 Pounds of Milk.						
		Actual cheese made.	Fat and casein basis.	Fat + calculated casein basis.	Fat + 2 basis.	Straight fat basis.	Straight casein basis.	Pooling basis.
p.c.	p.c.	cts.	cts.	cts.	cts.	cts.	cts.	cts.
3·10	2·10	82·9	83·6	85·6	87·9	84·0	83·1	93·5
3·10	2·30	85·2	86·8	85·6	87·9	84·0	90·0	93·5
3·15	2·45	87·3	90·0	86·8	88·7	85·3	96·9	93·5
3·20	2·30	86·3	88·4	87·9	89·6	86·7	90·0	93·5
3·25	2·00	91·0	84·4	89·1	90·4	88·1	79·1	93·5
3·30	2·40	92·7	91·7	90·2	91·3	89·4	95·0	93·5
3·30	2·40	90·6	91·7	90·2	91·3	89·4	95·0	93·5
3·40	2·60	95·6	96·5	92·5	93·0	92·1	102·9	93·5
3·40	2·30	91·5	91·7	92·5	93·0	92·1	90·0	93·5
3·40	2·00	93·6	86·8	92·5	93·0	92·1	79·1	93·5
3·40	2·50	86·8	94·9	92·5	93·0	92·1	98·9	93·5
3·50	2·45	95·4	95·7	94·8	94·8	94·8	96·9	93·5
3·55	2·45	95·9	96·5	95·9	95·6	96·2	96·9	93·5
3·65	2·40	93·2	97·3	98·2	97·3	99·0	95·0	93·5
3·70	2·40	99·2	98·7	99·4	98·2	100·2	95·0	93·5
3·80	2·50	102·1	101·1	101·7	99·9	102·9	98·9	93·5
4·00	2·60	107·5	106·1	106·2	103·4	108·4	102·9	93·5
4·00	2·35	104·9	102·1	106·2	103·4	108·4	93·0	93·5

The greatest differences in the value of 100 pounds of milk from the actual cheese made and the different methods of dividing the patrons' money are as follows:—

Pooling basis gives 10·6 cents over and 14 cents under; a variation of 24·6 cents.

Straight casein basis gives 12·1 cents over and 14·5 cents under; a variation of 26·6 cents.

Fat and casein basis gives 8·1 cents over and 6·8 cents under; a variation of 14·9 cents.

Fat + 2 gives 6·2 cents over and 4·1 cents under; a variation of 10·3 cents.

Straight fat basis gives 5·8 cents over and 3·5 cents under; a variation of 9·3 cents.

Fat + calculated casein basis gives 5·7 cents over and 3·1 cents under; a variation of 8·8 cents.

The surprising thing about these experiments is that the quantity of cheese made does not correspond with the actual amount of fat and casein in the milk, as shown by the Babcock test and the Walker casein test, and it would appear that there is not much to be gained by testing the milk for casein, as paying for cheese milk on a basis of the fat test, fat + 2 or fat + calculated casein will give results as near or nearer to the actual cheese made than paying on the basis of the actual fat and casein tests. Further, if we leave out the pooling method, there is not much choice between paying the patrons on the basis of straight fat, fat + 2, or fat + calculated casein, and no one would be far wrong if he used any one of these methods, but it is quite evident that paying for milk made into cheese at a uniform rate per 100 pounds is decidedly unfair and wrong.

The following table shows the total fat lost per 100 pounds of milk in manufacturing the cheese. The drippings from the curds after milling, and the whey from the press were carefully weighed and tested. The highest test from these drippings was 3·2 per cent; the lowest 1·1 per cent. The quantity of drippings from the curds after milling and during pressing averaged slightly over one-half pound per 100 pounds of milk.

TABLE IV.—Loss of Fat in Whey.

Per cent fat in milk.	Per cent casein in milk.	Per cent fat in whey at dipping.	Pounds fat lost per 100 pounds milk, in whey after milling.	Total pounds fat lost per 100 pounds of milk.
3·10	2·10	0·20	0·019	0·205
3·10	2·30	0·18	0·025	0·188
3·15	2·45	0·17	0·015	0·169
3·20	2·30	0·18	0·013	0·175
3·25	2·00	0·18		
3·30	2·40	0·13	0·019	0·135
3·30	2·40	0·19	0·024	0·195
3·40	2·60	0·21	0·002	0·191
3·40	2·30	0·20	0·023	0·202
3·40	2·00	0·19		
3·40	2·50	0·20	0·014	0·198
3·50	2·45	0·17	0·016	0·169
3·55	2·45	0·22		
3·65	2·40	0·15	0·028	0·160
3·70	2·40	0·22		
3·80	2·50	0·20	0·013	0·191
4·00	2·60	0·32	0·007	0·290
4·00	2·35	0·16	0·017	0·158

It is apparent from these experiments that there need be no greater loss of butter fat in manufacturing cheese from 4 per cent milk than from 3 per cent milk.

CHEESE FROM PASTEURIZED MILK.

A few lots of cheese were made during the past season from pasteurized milk with hydrochloric acid added after pasteurization. The main object of the work was to ascertain the effect pasteurizaton would have on the flavour of the cheese. Other details were not noted very carefully. Some 1,400 pounds of milk were put into a Jensen cream ripener to ensure thorough mixing. With the coil running, half of the milk was drawn off and put in a small cheese vat. The remainder was heated in the ripener to 160 degrees and cooled again to 80 degrees as quickly as possible, and then put in a small cheese vat where the

cheese were made according to the directions given in Bulletin No. 165, Bureau of Animal Industry, Washington, D.C., "The Manufacture of Cheese of the Cheddar Type from Pasteurized Milk." The unpasteurized milk was made up in the ordinary way. Three-quarters of 1 per cent starter was used in both lots of milk. The average time from adding the rennet to salting the curds was 6 hours and 30 minutes with the raw milk, and 5 hours and 20 minutes with the pasteurized milk. The texture of the cheese from the pasteurized milk was smooth but rather weak and open for Canadian Cheddar cheese. I am of the opinion that this defect would be overcome if the curds were allowed to mature longer before adding the salt.

The following table shows the flavour of the cheese at different dates. The "A" lots are from pasteurized milk.

Exp. No.	Date of Scoring.		
	September 27.	November 3.	December 24.
A- 5....	Good flavour.....	light acid flavour	Clean.
B- 5....	Good flavour	Not quite clean.	A little off.
A- 6....	Clean flavour	Clean.....	Not quite clean.
B- 6....	Clean flavour.....	Off flavour.....	Quite off.
A- 7....	Clean flavour.....	Slight acid flavour.....	Nice and clean.
B- 7....	Clean flavour.....	Good flavour.....	Quite off.
A-11.	Strong acid flavour	light acid flavour	Slight acid flavour.
B-11...	Good flavour.....	ff flavour	Very badly off.
A-12....	Fairly clean.....	light acid flavour	light acid flavour.
B-12....	Good.....	Nippy flavour	Badly off.
A-26....	Slight acid flavour....	Clean flavour	Clean.
B-26....	Clean flavour.....	Not quite as clean as A.....	lean.

Acid flavour means hydrochloric acid flavour.

PASTEURIZATION OF CREAM FOR BUTTERMAKING.

The pasteurization of cream for buttermaking is becoming more general in Canada and, when properly done, will materially improve the keeping quality of creamery butter. There are various styles of pasteurizers on the market at the present time, and these different machines may be divided into two classes: (1) those in which the cream can be pasteurized and held at a certain temperature for any desired period and then cooled in the same machine; this is usually called the "holding" method of pasteurizing; (2) the continuous or "flash" method, which heats the cream almost instantly as it passes through the machine in a continuous stream and is cooled by running it over a separate cooler. The Brome creamery is equipped with both systems in such a manner that either can be used to handle all the cream received at the creamery, as well as for smaller experimental lots. For convenience in tabulating the results of the experiments, we will designate the holding method "A," the continuous method "B," and the raw cream "C." The equipment for "A" method was a 300-gallon Wizard agitator; for the "B" method a 2,000-pound capacity Simplex pasteurizer, and a 3,900-pound capacity Tubular cooler; and for the "C" method an ordinary cream vat. The churning was done in a small combined churn. The cooling was done with cold water and ice.

At the Brome creamery about two-thirds of the cream is separated at the creamery; the balance is delivered by patrons who are using hand separators. The cream from two skimming stations is also received.

Quality of the Butter.—In conducting this experiment, all the cream was put in a Wizard agitator and, with the discs running, a churning of the raw cream was drawn off, then the same quantity of cream was run through the Simplex pasteurizer, cooled with the Tubular cooler and ripened in an ordinary cream vat. The balance was pasteurized, cooled and ripened in the Wizard agitator. The experiment was repeated ten times between July 1 and 22. Ten per cent starter was used in all the lots of cream. The following tables show the averages of the ten churnings in each lot.

TABLE 1.

—	Pounds cream.	Per cent fat in cream.	Past. temp.	Time held at past. temp.	Per cent acidity in cream after past.	Acidity in cream at churning.
			deg.	min.		
A	210	34·0	140	20	0·194	0·455
B	210	33·5	171	2	0·187	0·411
C	210	33·7	.....	.....	0·213	0·473

—	Temp. of cream at churning.	Time churning.	Per cent fat in buttermilk.	Per cent moisture in butter.	AVERAGE SCORE FOR FLAVOUR OF BUTTER.	
					July 22.	Nov. 19.
	deg.	min.				
A	56·1	30·0	0·203	13·35	43·17	39·15
B	53·6	30·5	0·201	13·85	43·17	39·15
C	53·5	42·4	0·170	13·76	42·90	37·40

Notes on the Flavour of the Butter.—"A" lots: On July 22 the highest score was 43·5; the lowest was 42·75. On November 19 the highest score was 41 and the lowest 38. One lot made on July 10 showed a slight fishy flavour on November 19.

"B" lots: On July 22 the highest score was 43·5 and the lowest 42·75. On November 19 the highest score was 41·5 and the lowest 36·5. The butter scoring 36·5 was made July 10, and was fishy.

"C" lots: On July 22 the highest score was 43·75 and the lowest 42. On November 19 the highest score was 38·5 and the lowest 36. The butter that scored 43·75 in July was fishy in November, and scored only 37. The butter in this lot made on July 10 was not fishy on November 19.

On July 22 there was practically no difference in the commercial value of the three lots of butter. On November 19 the butter from the raw cream had gone off in flavour much more than the lots from pasteurized cream.

As far as these experiments show there is no difference in the quality of the butter from either method of pasteurizing. The butter was scored on November 19 by Mr. J. D. Leclair, Inspector General of Creameries in Quebec.

Cost of Ice and Fuel.—The following table shows the average cost per 1,000 pounds of butter for ice and fuel in operating the creamery five days with each method of pasteurizing the cream:—

——	Total pounds butter made.	Total pounds ice used.	Cost of ice per 1,000 pounds butter.	Cost of fuel per 1,000 pounds butter.	Total Cost for fuel and ice per 1,000 pounds. butter.	Average time creamery was in operation each day.
			cts.	$ cts.	$ cts.	
A	2,777	1,240	0·22	1·64	1·86	5 hr., 13 min.
B	2,711	200	0·02	1·53	1·55	4 " 57 "

The principal point of difference is in the quantity of ice used. With the full pressure of water from an overhead tank on the Tubular cooler, the cream was cooled almost to churning temperature, and very little ice was required in the water in the ordinary cream vat to hold the temperature overnight.

Cost of Apparatus for Pasteurizing the Cream.

A.—300-gallon Wizard agitator		$ 550.00
B.—2,000-pound Simplex pasteurizer	$ 225.00	
3,900-pound Tubular cooler	265.00	
Ordinary cream vat	65.00	
		555.00

Summary.

In operating the Brome creamery, the continuous pasteurizing method took slightly less time and fuel, and very much less ice. This method was found very convenient when part of the cream was pasteurized for city trade, as the cream could be run directly from the cooler into the shipping cans. Its disadvantage is a little more apparatus to clean. The ripener method has the advantage of being more compact as to floor space required and less apparatus to clean.

Flavour of Butter made from Ripened and Unripened Pasteurized Cream.—Butter made August 10 to 14.

A Lot.—Ten per cent starter added, ripened in the ordinary way and churned the following morning.

B Lot.—Twenty per cent starter added and churned same day.

Experiment.	Average time ripening.	Average acidity at churning.	Average fat in buttermilk.	Average score on flavour.
	hrs.			
A	2	0·25	0·22	42·2
B	18	0·36	0·23	41·4

The butter was scored on November 19 by Mr. J. D. Leclair, Inspector General of Creameries in Quebec.

Churning the cream on the same day as it is received is not practicable in many creameries, but when it can be done there is little doubt about the quality of the butter being finer than when the cream is allowed to stand overnight.

Uniform Salting of Butter.

Complaints are made by buyers of butter in regard to the uneven salting of creamery butter. Considerable work was done at Brome on this point during the summer of 1914 in a small combined churn. Some buttermakers claim, however, that accurate results could not be secured in a small churn and, for this reason, the results obtained will not be published until further experiments are made with the large creamery churn.

Cow Testing.

During the year there were thirty-five Dairy Record Centres in operation with a recorder appointed by the department in charge of each. In addition to these centres, there were sixty-two points at which the cheese and buttermakers tested samples from herds in the different districts.

The work is being extended considerably in 1915 by organizing new associations or testing points where the recorders can give some oversight to the work. The cow-testing movement can be developed to a wonderful extent if the cheese and buttermakers could only be induced to do the testing of the samples. The increase in the milk supply from keeping records of individual cows would well repay the owners of cheese factories and creameries for any time or expense incurred in testing. The department is still providing preservative tablets, blank forms, acid, and a limited amount of glassware to these associations or testing points; also paying the person who does the testing 5 cents per test.

The reports of the supervisors of cow testing, Mr. Harvey Mitchell, Charlottetown, P.E.I.; Mr. H. W. Coleman, Perth, Ont.; and Mr. J. B. E. Trudel, Lac à la Tortue, Champlain county, Que., will be found interesting.

Mr. C. F. Whitley's report, as usual, covers in detail the work of cow testing, and contains much valuable information gleaned from the herd records received during the year.

I am much indebted to Mr. J. G. Bouchard, who conducted the experimental work on buttermaking at the Brome creamery; also to Mr. H. W. Coleman for valuable assistance in carrying on the experimental work on cheesemaking at the Finch dairy station.

Much credit is due Mr. B. A. Reddick, manager of the Finch dairy station, for creating so much interest in cow testing and also in assisting the Ontario District Representative in carrying on a Short Course in agriculture during the month of February, which was held in the curing room at the factory, with an attendance of twenty-six for the full course and a total attendance of eighty-one.

I am also very much indebted to Mr. J. D. Leclair, Inspector General of Creameries in the province of Quebec, for his kindness in scoring the experimental lots of butter in Montreal on November 19.

GEO. H. BARR,

Chief, Dairy Division.

OTTAWA, March 31, 1915.

APPENDIX IV.

COW TESTING, AND DAIRY RECORD CENTRES.

The general plan of conducting the work of cow testing in 1914 was much the same as in former years.

There is a considerable increase in the number of farmers who are keeping records of the cost of feed. Securing accurate figures regarding the feed consumed by a herd requires considerable time and care, but the results are well worth while, and the recorders are encouraging this feature of the work. This report must necessarily contain a great many figures, but they have been arranged in tabular form as concisely as possible.

TABLE 1.—Total Number of Herds, Cows and Babcock Tests made by Provinces, 1914.

Province.	Herds.	Cows.	Tests.
Ontario	798	8,681	57,239
Quebec	642	6,158	38,569
New Brunswick	218	1,613	10,306
Nova Scotia	269	1,649	10,608
Prince Edward Island	141	858	5,073
Saskatchewan	41	197	1,339
Totals	2,109	19,156	123,134

As in former years, very many farmers do not continue keeping records for the full lactation period. Keeping records for three or four months may give some idea of the quantity of milk the cows give, but the only way to *know* is to keep records for the full lactation period. This year there were 399 herds with 4,695 cows from which records were received for only part of the lactation period.

TABLE 2.—Showing Herds, Cows and Average Yields for Full Lactation Period by Provinces.

Province.	Number of Herds.	Number of Cows.	Average Yield.		
			Milk.	Test.	Fat.
			Lb.	%	Lb.
Ontario	719	7,425	5,692	3·5	200·1
	*24	267	5,626	.....	
Quebec	483	4,308	4,388	3·9	171·2
	*2	28	5,097	.....	
New Brunswick	146	1,087	4,376	4·0	176·8
Nova Scotia	190	960	4,537	4·1	188·5
Prince Edward Island	117	628	5,505	3·7	207·3
	*1	7	6,182	.....	
Saskatchewan	30	151	5,399	3·7	202·6
	1,685	14,559	5,121	3·69	189·4
	*27	302	5,441	.....	
Totals	1,712	14,861	.....	.....	

*Weights only.

The increase in herds recorded for the full lactation period over 1913 is 626, and the number of cows is 4,776. The average pounds of milk and pounds of fat is slightly lower than in 1913; the per cent of fat in the milk is ·09 higher.

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TABLE 3.—Average Yields of Cows Recorded for the Full Period of Lactation in each Dairy Record Centre and Association in the Province of Ontario, 1914.

Electoral District.	Name.	No. of Herds.	No. of Cows.	Average Yield		
				Milk.	Test.	Fat.
	Dairy Record Centre.			Lb.	%	Lb.
Stormont	Avonmore	47	537	5,290	3·5	186·4
Glengarry	Alexandria	31	358	5,616	3·6	204·0
Stormont	Cornwall	50	633	5,033	3·7	190·4
Grenville	Farmers' Union	47	436	5,558	3·5	194·2
"	"	*2	18	5,492		
Hastings	Frankford	59	562	6,166	3·5	216·9
Dundas	Hallville	48	585	5,212	3·5	182·4
"	"	3	33	4,654		
Oxford	Ingersoll	20	249	7,165	3·3	237·9
Kingston	Kingston	30	376	5,621	3·4	193·4
"	"	*1	25	5,342		
Perth	Listowel	54	523	6,875	3·4	234·1
Brockville	Mallorytown	28	377	5,653	3·4	192·5
"	"	*5	49	5,411		
Carleton	North Gower	49	478	5,056	3·6	183·3
Lanark	Perth	40	345	5,204	3·4	177·7
"	"	*11	126	5,977		
Peterborough	Peterborough	58	522	6,296	3·4	214·6
"	"	*1	7	5,765		
Renfrew, S. R.	Renfrew	42	354	5,516	3·5	204·2
Ontario, N. R.	Sunderland	26	182	5,576	4·0	226·4
	Associations.					
Durham	Port Hope	2	11	4,604	3·6	167·7
Glengarry	Martintown	11	200	4,889	3·6	175·7
Grenville	Prescott	1	21	7,050	3·1	224·1
Hastings	Plum Grove	3	31	7,498	3·1	235·6
Leeds	Newboro	7	105	5,312	3·5	186·7
"	Westport	3	27	6,148	3·7	227·8
Peel	Star	1	9	6,081	3·1	191·2
Russell	Dalmeny	3	28	5,933	3·5	208·4
Renfrew	Navan	3	21	4,578	3·3	152·0
Stormont	Finch	9	119	5,189	3·4	180·3
"	River Bank	2	17	3,920	3·7	145·0
Algoma	Echo Bay	4	7	4,924	3·5	173·0
"	Gore Bay	2	9	4,614	3·3	155·6
"	Silverwater	6	25	4,776	3·6	172·3
Halton	Milton	2	12	6,632	3·6	240·1
Lincoln	Silverdale	5	29	5,915	3·6	216·1
Oxford, N. R.	Cassel	2	16	6,614	3·4	228·4
"	German Union	3	22	6,934	3·4	231·8
"	Innerkip	3	43	6,761	3·3	224·0
Perth	Avonbank	2	17	7,838	3·5	275·1
"	Black Creek	5	47	7,379	3·3	249·0
Wellington	Guelph	11	92	6,169	3·3	208·8
"	"	*1	9	1,136		
General average for the province— Weights and Tests		719	7,425	5,692	3·5	200·1
		*24	267	5,626		

*Weights only. (The average per cent of fat in 1913 was 3·6.)

TABLE 4.—Average Yields of Cows Recorded for the Full Period of Lactation in each Dairy Record Centre and Association in the Province of Quebec, 1914.

Electoral District.	Name.	No. of Herds.	No of. Cows.	Average Yield		
				Milk.	Test.	Fat.
	Dairy Record Centre.			lb	%	lb
Chicoutimi and Saguenay	Metabetchouan	19	234	4,327	4·0	173·6
Montmagny	Montmagny	75	558	4,134	3·8	157·7
Pontiac	Shawville	37	293	4,469	3·6	162·9
L'Islet	St. Aubert	41	276	3,877	4·1	160·8
Beauce	St. George	15	76	4,076	3·8	156·1
Dorchester	Ste. Henedine	31	240	3,796	3·8	146·1
St. Hyacinthe	St. Hyacinthe	61	570	5,057	3·8	195·3
Champlain	St. Prosper	41	436	4,270	3·8	164·5
Bellechasse	St. Raphael	41	270	3,935	4·1	161·4
Stanstead	Way's Mills	53	671	4,768	3·9	188·0
	Associations.					
Berthier	Cap St. Gabriel	3	27	4,397	4·2	186·2
Berthier	St. Damien de Brandon	1	11	3,218	4·1	132·2
Bonaventure	St. Alexis de Matapedia	5	23	3,209	4·0	130·1
Brome	Brome	3	37	4,619	4·3	202·4
Chambly and Vercheres	Beloeil	4	38	4,692	3·7	177·5
Champlain	Ste. Genevieve	1	9	5,084	4·1	208·7
Chateauguay	Ormstown	1	16	6,025	..	..
Chicoutimi and Saguenay	St. Prime	2	22	3,852	3·9	151·0
Compton	Martins Corners	3	38	4,405	4·2	188·2
Drummond and Arthabaska	St. Germain de Grantham	2	19	5,271	3·4	184·3
Huntingdon	Hallerton	*1	12	3,860		
Lotbiniere	Ste. Emelie	1	8	3,366	3·9	132·3
Megantic	East Leeds	7	48	3,923	3·7	146·3
Megantic	St. Pierre de Broughton	5	32	3,827	3·5	137·4
Missisquoi	Cowansville	5	86	5,291	3·9	211·0
Missisquoi	Dairy Valley	1	8	5,575	3·5	197·9
Richmond	Richmond and Melbourne	1	8	5,841	3·8	224·6
Shefford	Mawcook	4	68	3,577	3·8	137·6
Shefford	Shefford Mountain	2	16	3,419	3·7	128·7
Shefford	Waterloo	2	35	5,850	3·5	206·0
Stanstead	Coaticook	1	13	4,243	4·3	184·4
Stanstead	Dixville	5	48	3,947	4·1	165·3
Stanstead	St. Hermenegilde	5	41	3,503	4·3	150·7
Stanstead	North Hatley	6	49	4,666	3·7	173·4
General average for the province— Weights and Tests		483	4,308	4,388	3·9	171·2
		*2	28	5,097		

*Weights only. (The average percent of fat in 1913 was 3·9.)

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TABLE 5.—Average Yields of Cows recorded for the Full Period of Lactation in each Dairy Record Centre and Association in the Province of New Brunswick, 1914.

Electoral District.	Name.	No. of Herds.	No. of Cows.	Average Yield.		
				Milk.	Test.	Fat.
	Dairy Record Centre.			lb.	%	lb.
Kings and Albert	Sussex	47	540	4,903	4·0	200·7
Westmoreland	St. Joseph	70	358	3,679	3·9	144·0
	Associations.					
Kings and Albert	Hampton	4	33	3,694	3·8	140·8
"	Kingston	3	18	4,788	4·6	221·4
Sunbury and Queens	Jerusalem	10	58	3,520	4·0	144·1
York	Manners Sutton	12	80	4,741	4·0	190·4
General average for the province		146	1,087	4,376	4·0	176·8

(The average per cent of fat in 1913 was 4·0.)

TABLE 6.—Average Yields of Cows Recorded for the Full Period of Lactation in each Dairy Record Centre and Association in the Province of Nova Scotia, 1914.

Electoral District.	Name.	No. of Herds.	No. of Cows.	Average Yield.		
				Milk.	Test.	Fat.
	Dairy Record Centre.			lb.	%	lb.
Antigonish	Antigonish	24	146	3,809	4·0	153·3
Digby	Clare	3	9	3,648	4·4	163·0
"	Meteghan	41	107	3,480	4·6	161·3
Pictou	Scotsburn	61	355	4,955	4·2	212·3
Colchester	Truro	54	294	4,585	3·8	176·0
	Associations.					
Kings	Kingston	3	29	5,918	4·0	244·7
Yarmouth	Yarmouth	4	20	5,678	4·9	281·9
General average for the province		190	960	4,537	4·1	188·5

(The average per cent of fat in 1913 was 4·3.)

TABLE 7.—Average Yields of Cows Recorded for the Full Period of Lactation in each Dairy Record Centre and Association in the Province of Prince Edward Island, 1914.

Electoral District.	Name.	No. of Herds.	No. of Cows.	Average Yield.		
				Milk.	Test.	Fat.
	Dairy Record Centre.			lb.	%	lb.
Queen's	Crapaud	60	312	5,397	3·5	193·4
"	"	* 1	7	6,182	.....	.....
Prince	Kensington	50	268	5,314	3·9	207·9
	Association.					
Queen's	Marshfield	7	48	7,283	4·0	294·6
General average for the province		117	628	5,505	3·7	207·3
		* 1	7	6,182	.....	.....

* Weights only.

(The average per cent of fat in 1913 was 3·9.)

TABLE 8.—Average Yields of Cows Recorded for the Full Period of Lactation in the Province of Saskatchewan, 1914.

Electoral District.	Name.	No. of Herds.	No. of Cows.	Average Yield.		
				Milk.	Test.	Fat.
	Dairy Record Centre.			lb.	%	lb.
Battleford	Lloydminster	29	134	4,844	3·8	186·2
	Association.					
Moose Jaw	Bolharm	1	17	9,769	3·4	332·5
General average for the province		30	151	5,399	3·7	202·6

As in previous years, the differences last year in the average yields of milk and fat, whether between individual cows in the same herd, between herds in the same district, or between herds in different provinces, are very remarkable.

Instead of making lengthy comment on these differences, attention is particularly directed to the following two tables showing some of the best herds, and some of the best individual cows.

TABLE 9.—Yields of a Few of the Best Herds Recorded in 191..

Province, Record Centre or Association.	Number of Cows in Herd.	Average Yield.		
		Milk.	Test.	Fat.
		Lb.	%	Lb.
Ontario—				
Listowel	5	11,448	3·2	365·8
"	8	11,421	3·4	384·6
Ingersoll	12	10,657	3·0	317·2
"	22	10,542	3·3	350·9
Perth	8	9,949	3·0	304·1
Frankford	8	9,928	3·5	336·5
Peterboro'	9	9,718	3·1	300·3
Black Creek	9	9,275	3·1	294·8
Quebec—				
St. Hyacinthe	11	9,170	3·6	330·0
Wag[illegible]	21	8,026	3·8	305·3
"	3	6,269	4·9	308·1
Waterloo	19	6,803	3·3	230·0
St. Albert	6	6,370	4·4	282·7
"	3	6,734	4·0	273·2
New Brunswick—				
St. Joseph	2	6,515	4·7	307·9
Sussex	12	7,184	3·6	263·3
"	13	5,657	4·7	283·7
Nova Scotia—				
Scotsburn	3	8,607	3·8	328·9
Truro	4	6,821	4·3	298·8
Yarmouth	6	6,145	5·1	315·3
Prince Edward Island—				
Mount Stewart	9	9,186	3·6	335·5
Tignish	5	9,056	3·5	322·2
Kensington	5	8,601	3·8	327·6
Saskatchewan—				
Boharm	17	9,769	3·4	332·5
Lloydminster	3	7,653	3·3	254·6

These herds are instanced as samples of what our progressive dairymen are accomplishing through cow testing. Such good yields as 305, 332, and 350 pounds of fat per cow from herds of 21, 17 and 22 cows are full of encouragement.

TABLE 10.—Yields of a Few of the Best Individual Cows Recorded in 1914.

Province, Record Centre or Association.	Total Yield.		
	Milk.	Test.	Fat.
	Lb.	%	Lb.
Ontario—			
Ingersoll	18,250	2·8	505·0
Strathroy	15,930	3·3	528·2
Listowel	14,920	2·8	425·4
"	13,680	3·5	481·2
Guelph	13,560	3·0	406·8
Cornwall	13,027	3·9	513·2
Peterboro	13,125	3·6	482·5
Highgate	12,704	3·5	442·2
Lyndoch	12,159	3·7	447·2
"	12,587	2·9	366·0
Markham	12,058	3·0	356·7
Kinsale	12,012	3·1	370·0
Quebec—			
St. Hyacinthe	12,420	3·4	433·7
Way's Mills	12,200	3·1	384·7
"	10,370	4·0	420·5
Waterloo	10,180	3·4	349·4
Dairy Valley	9,610	3·0	294·4
St. Pierre	8,979	3·7	336·4
Shawville	8,974	3·8	356·9
Brome	8,664	5,7	496·1
New Hampshire—			
Stark	9,965	3·8	380·4
"	9,585	4·2	402·6
St. Johnsbury	8,140	5·2	424·0
"	8,790	3·9	345·4
Manners Sutton	8,210	3·7	304·2
"	7,890	3·9	312·7
Nova Scotia—			
Springhill	14,400	3·8	550·2
Kingston	11,940	4·3	512·5
Truro	9,605	3·1	305·0
"	8,896	4·9	438·0
Antigonish	8,665	3·7	327·6
"	6,455	5·1	333·6
Yarmouth	8,425	5·3	449·0
Prince Edward Island—			
Cornwall	13,374	3·4	460·0
Marshfield	13,008	4·0	576·5
Kensington	12,242	2·9	366·3
"	9,783	4·1	401·1
Saskatchewan—			
Borden	13,128	3·3	443·1
"	12,714	3·6	459·0
Lloydminster	11,321	4·5	510·3

These yields of over 400 and 500 pounds of fat per cow are great tributes to the intelligence of the men in handling good producers. From this and the preceding table it will be seen that cow testing helps to establish good records in widely scattered districts.

TABLE 11.—Summary of Average Monthly Yields, 1914.

Month and Province.	Number of Herds.	Number of Cows.	Average Yield.		
			Milk.	Test.	Fat.
			Lb.	%	Lb.
January—					
Prince Edward Island	18	88	701	3·8	26·8
Nova Scotia	89	326	511	4·4	22·6
New Brunswick	60	326	493	4·4	21·4
Ontario	191	1,110	570	3·6	20·9
Quebec	64	481	478	4·2	20·1
General average yield	422	2,331	537	4·0	21·3
" " weights only	22	154	629		
February—					
Prince Edward Island	21	88	767	3·8	29·3
Ontario	211	1,021	698	3·6	25·2
Nova Scotia	92	329	550	4·3	23·6
New Brunswick	55	302	543	4·2	23·1
Quebec	77	473	561	3·7	20·2
General average yield	456	2,213	628	3·8	24·7
" " weights only	24	110	669		
March—					
Saskatchewan	14	52	894	3·5	32·9
Prince Edward Island	30	114	719	3·7	27·0
Ontario	756	1,609	778	3·4	25·4
Nova Scotia	93	344	585	4·2	24·6
New Brunswick	69	310	580	4·1	24·0
Quebec	122	616	612	3·8	23·5
General average yield	678	3,075	680	3·7	24·9
" " weights only	30	162	745		
April—					
Prince Edward Island	42	134	820	3·6	29·3
Ontario	568	3,555	730	3·4	26·2
Saskatchewan	22	72	678	3·6	24·2
Nova Scotia	149	640	584	4·1	23·8
New Brunswick	60	396	582	3·9	22·1
Quebec	253	1,615	636	3·6	22·5
General average yield	1,094	6,412	712	3·5	24·9
" " weights only	50	288	668		
May—					
Ontario	730	6,150	886	3·3	29·8
Prince Edward Island	98	255	777	3·6	27·6
Saskatchewan	28	129	675	3·6	23·7
Quebec	472	3,601	659	3·6	23·7
New Brunswick	138	936	611	3·8	23·1
Nova Scotia	197	926	573	3·9	22·3
General average yield	1,633	11,997	768	3·4	26·8
" " weights only	52	407	800		
June—					
Ontario	760	7,452	915	3·3	30·6
Prince Edward Island	98	507	862	3·5	30·5
Saskatchewan	37	175	745	3·7	27·4
Quebec	585	5,070	717	3·7	26·1
New Brunswick	188	1,355	658	3·9	25·9
Nova Scotia	252	1,389	578	4·0	23·1
General average yield	1,920	15,948	791	3·5	28·1
" " weights only	38	419	847		

TABLE 11.—Summary of Average Monthly Yields, 1914—*Concluded.*

Month and Province.	Number of Herds.	Number of Cows.	Average Yield.		
			Milk.	Test.	Fat.
			Lb.	%	Lb.
July—					
Prince Edward Island	114	666	837	3·7	31·3
Saskatchewan	34	175	735	3·6	26·5
Ontario	730	7,522	763	3·3	25·5
Quebec	629	5,896	634	3·7	23·9
New Brunswick	200	1,465	595	3·9	23·3
Nova Scotia	279	1,618	551	4·0	22·3
General average yield	1,986	17,342	687	3·6	24·7
" " weights only	41	435	651		
August—					
Prince Edward Island	136	801	748	3·6	27·3
Saskatchewan	31	169	678	3·9	26·8
Ontario	715	7,408	663	3·4	23·0
Quebec	596	5,555	551	3·9	21·6
Nova Scotia	266	1,469	503	4·0	20·4
New Brunswick	221	1,536	503	4·0	20·2
General average yield	1,965	16,938	601	3·7	22·3
" " weights only	31	311	619		
September—					
Saskatchewan	30	178	574	4·1	23·7
Prince Edward Island	128	768	658	3·5	23·4
Ontario	681	7,012	650	3·6	23·3
Quebec	580	5,351	511	4·1	21·2
Nova Scotia	234	1,243	441	4·2	18·6
New Brunswick	205	1,349	420	4·2	17·7
General average yield	1,858	15,901	566	3·8	21·8
" " weights only	42	348	603		
October—					
Prince Edward Island	115	688	580	3·9	22·9
Saskatchewan	25	140	521	4·1	22·1
Ontario	657	6,417	550	3·8	20·9
Quebec	496	4,535	418	4·3	18·2
Nova Scotia	189	930	413	4·2	17·6
New Brunswick	168	1,051	375	4·3	16·2
General average yield	1,650	13,761	502	4·0	19·5
" " weights only	35	342			
November—					
Prince Edward Island	100	568	483	4·1	19·7
Saskatchewan	24	125	462	4·1	18·9
Nova Scotia	166	766	387	4·4	17·2
Ontario	517	4,948	417	3·9	16·3
New Brunswick	116	730	345	4·5	15·6
Quebec	399	3,337	336	4·5	15·1
General average yield	1,322	10,474	388	4·1	16·1
" " weights only	23	243	358		
December—					
Prince Edward Island	73	396	488	4·1	20·0
Nova Scotia	148	655	453	4·3	19·8
Saskatchewan	24	124	452	4·1	18·4
New Brunswick	84	426	410	4·3	17·7
Ontario	385	3,035	398	3·9	15·7
Quebec	282	2,039	314	4·6	14·4
General average yield	996	6,742	385	4·2	16·5
" " weights only	18	144	450		

During 1914 the number of samples of milk tested each month in the Dominion varied from 2,213 in February to 17,342 in July. The total number tested during the year was 123,134 samples with an average of 3·71 per cent of fat.

TABLE 12.—Average percentage of Fat by Months and Provinces.

Months, 1914.	Ontario.		Quebec.		New Brunswick.		Nova Scotia.		P. E. Island.		Saskatchewan.		Total Cows. Average Fat.	
	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.	No. of Cows.	Per Cent Fat.
January	1,110	3·6	481	4·2	326	4·4	326	4·3	88	3·8			2,331	4·0
February	1,021	3·6	473	3·7	302	4·2	329	4·1	87	3·8			2,213	3·8
March	1,609	3·4	616	3·8	340	4·1	344	4·2	114	3·7	52	5·5	3,075	3·7
April	3,553	3·4	1,615	3·6	396	3·9	640	4·1	134	3·6	72	3·6	6,412	3·5
May	6,150	3·3	3,601	3·6	953	3·8	929	3·9	255	3·6	129	3·6	11,997	3·4
June	7,452	3·3	5,070	3·7	1,355	3·9	1,389	4·0	507	3·5	175	3·7	15,948	3·5
July	7,522	3·3	5,896	3·7	1,465	3·9	1,618	4·0	660	3·7	175	3·7	17,342	3·6
August	7,408	3·4	5,555	3·9	1,536	4·0	1,469	4·0	801	3·6	166	3·9	16,938	3·7
September	7,012	3·6	5,351	4·1	1,349	4·2	1,243	4·2	765	3·5	178	4·1	15,901	3·8
October	6,417	3·8	4,553	4·3	1,051	4·3	870	4·2	685	3·9	140	4·1	13,761	4·0
November	4,948	3·9	3,337	4·5	730	4·5	766	4·4	565	4·1	125	4·1	10,474	4·1
December	2,915	3·9	2,039	4·6	495	4·5	655	4·3	519	4·1	123	4·1	6,742	4·2

DAIRY RECORD CENTRES.

There were thirty-five dairy record centres in operation during 1914 at each one of which an official of this branch, termed a recorder, devoted his time to the interests of dairying. Besides the actual work of testing milk samples every month, considerable time was spent by the recorders in consultation with the dairymen of the several districts, addressing meetings, attending fall fairs; and in some cases, at the special request of the Ontario Department of Agriculture District Representative, assisting with short courses in agriculture and introducing milk testing in schools.

As a direct outcome of the recorder's influence there are not only satisfactory increases in the yield of milk per cow, but decided improvement in the general run of dairy farming, evidenced by the introduction of pure bred dairy sires, the erection of silos and great improvements in dairy stables.

Some of the information collected by the recorders in taking a dairy census in each district is tabulated below.

TABLE 13.—Dairy Record Centres, 1914, Summary.

Dairy Record Centre.	Total Number of Herds.	Total Number of Cows.	Average Yield per Cow.	Average Yield per Acre Cultivated including Pasture.	Average Number of Cows kept per 100 Acres.	Average Feed Cost of 100 pounds of Milk.	Average Cash Receipts per Cow with Milk at $1.10 per 100 pounds.	Estimated Cost of Feed per Cow.	Average Profit per Cow over Cost of Feed.
			Lb. Milk	Lb. Milk		Cts.	$ cts.	$ cts.	$ cts.
Alexandria, Ont.	13	151	5,424	548	10	63	59 67	34 21	25 46
Cornwall, Ont.	20	228	5,169	477	10	67	56 86	34 56	22 27
Farmers' Union, Ont.	10	388	5,822	454	8	69	64 05	40 35	23 70
Hallville, Ont.	5	43	4,217	384	9	81	46 38	35 86	11 22
Kingston, Ont.	8	116	5,391	499	9	80	60 24	41 19	19 05
Listowel, Ont.	37	400	6,620	712	11	71	72 82	47 00	24 00
Mallorytown, Ont.	15	238	5,106	533	10	78	56 17	39 98	14 19
North Gower, Ont.	20	227	5,279	460	8	65	58 07	39 00	19 07
Perth, Ont.	5	57	5,089	362	7	62	55 98	32 04	23 94
Peterboro, Ont.	6	46	5,323	428	8	79	58 55	42 35	16 20
Renfrew, Ont.	10	118	6,589	471	7	69	72 48	46 00	26 48
Totals and averages for Ontario.	179	1,955	5,856	[illegible]	9	70	64 41	41 26	23 15
St. Aubert, Que.	49	[illegible]	3,726	226	6	58	40 98	21 81	19 17
St. George, Que.	5	40	3,666	199	5	78	40 32	28 95	11 37
Ste. Henedine, Que.	31	260	4,067	329	8	75	44 73	30 77	13 96
St. Hyacinthe, Que.	61	570	5,057	386	7	66	55 63	33 36	22 27
St. Prosper, Que.	53	340	4,406	419	9	74	48 47	32 75	15 72
St. Raphael, Que.	40	272	3,883	274	7	74	42 71	28 87	13 84
Metabetchouan, Que.	26	379	3,338	425	13	86	36 72	28 72	8 00
Montmagny, Que.	80	633	4,044	327	8	76	44 48	30 71	13 75
Ways Mills, Que.	10	150	*201·7	*17·2	8	*20	60 51	43 96	16 55
Totals and averages for Quebec.	335	3,017	4,163	338	8	72	46 52	30 86	15 66
Crapaud, P.E.I.	31	189	5,573	411	7	75	60 78	42 22	18 56
Kensington, P.E.I.	33	189	5,425	339	6	68	59 68	37 16	12 52
Antigonish, N.S.	12	104	3,516	430	9	93	47 23	32 13	15 10
Clare, N.S.	3	11	*204	*15	7	*17	61 22	35 29	25 93
Musquodoboit, N.S.	4	12	4,519	577	12	74	47 71	33 15	15 56
Truro, N.S.	11	82	*176	*16	9	*22	52 93	39 28	13 65
St. Joseph, N.B.	65	355	3,627	224	6	85	40 32	31 04	8 28
Sussex, N.B.	11	142	203	*25	13	*13	61 78	38 03	21 75
Totals and averages for Maritime Provinces.	170	1,094	4,465	320	8	.....	50 77	28 25	22 50
Milk Districts						52	49 11	23 53	25 58
Fat Districts						20	50 77	28 25	22 50

*As Ways Mills, Que.; Clare, N.S.; Truro, N.S.; and Sussex, N.B.; are creamery sections, the yield per cow is taken in pounds of fat, valued at 30 cents per pound.

COST OF MILK PRODUCTION.

Without entering into any elaborate calculation, one which would include such actualities as interest on investment, taxes, insurance, etc., it is of decided importance to every dairy farmer to know if each cow that he is keeping yields a fair return for the feed consumed. Even leaving aside the items of skim-milk, labour, calf, manure, and making the simplest of calculations, the value of the milk produced and the value of the feed consumed, a flood of light is shed on the variation in profit returned by cows.

The following statements of last year's work are therefore presented so that dairymen may be induced to look carefully into this all-important question of obtaining a good profit from each cow.

TABLE 14.—Comparison between Eight of the Best and Eight of the Poorer Cows in Avonmore, Ont., Dairy Record Centre, showing differences in Yield, Cost of Production and Profits.

EIGHT COWS WITH HIGH YIELDS OF MILK.

Cow Number.	Age.	Yield, Pounds of Milk.	Value at $1.15 per 100 Pounds.	Feed Cost.	Profit Per Cow.
			$ cts.	$ cts.	$ cts.
1	5	6,425	73 87	41 88	32 99
2	11	6,640	76 36	40 09	36 27
3	8	6,411	73 72	42 77	30 95
4	7	8,522	98 00	51 28	46 72
5	8	8,051	88 56	51 57	36 99
6	7	7,120	81 97	45 36	36 61
7	8	7,079	81 42	49 92	31 50
8	6	6,220	69 33	33 09	36 24
Total		56,478	649 49	351 76	297 73

Average net profit per 100 pounds of milk, 54 cents.
Average cost of producing 100 pounds of milk, 62 cents.

EIGHT COWS WITH LOW YIELDS OF MILK.

Cow Number.	Age.	Yield, Pounds of Milk.	Value at $1.15 per 100 Pounds.	Feed Cost.	Profit Per Cow.
			$ cts.	$ cts.	$ cts.
1	6	3,180	36 57	25 05	11 52
2	6	4,400	50 60	37 39	13 21
3	7	4,299	49 43	36 18	13 25
4	5	3,691	42 44	31 65	10 79
5	5	3,450	39 67	31 65	8 02
6	7	4,273	49 13	35 72	13 41
7	7	3,876	44 57	29 34	15 23
8	6	4,125	47 43	31 70	15 73
Total		31,294	359 88	258 68	101 20

Average net profit per 100 pounds of milk, 32 cents.
Average cost of producing 100 pounds of milk, 82 cents.

From these comparisons it is readily seen that:—

(1) Cows that give fairly large yields of milk (6,000, 7,000 and 8,000 pounds) even when costing fifty dollars to feed, may be economical producers. For the average of the eight high yields is a feed cost of only 62 cents per 100 pounds of milk, and the individual profit above cost of feed is as high as $46.72.

(2) Conversely, the cows with only medium or low yields, though fed cheaper, are more expensive to keep. The eight cows with the low yields make only 32 cents profit on the 100 pounds of milk (compared with 54 cents profit from the high yielders) and the milk costs 20 cents per 100 more to produce.

(3) The individual profit above cost of feed varies to a remarkable degree, $8.02 on the year's business, up to $46.72.

Dairy records alone can bring out these facts.

TABLE 15.—Showing Variation in Feed Cost of Milk at Avonmore, Ont., Dairy Record Centre.

Herd.	No. of Cows.	Average Yield per Cow, Pounds of Milk.	Average Cash Returns per Cow, at $1.15 per 100 Pounds Milk.	Cost of Feed per Cow.	Profit per Cow over Feed Cost.	Feed Cost per 100 Pounds Milk.
			$ cts.	$ cts.	$ cts.	Cents.
A	13	3,831	44 05	32 17	11 88	84·9
B	12	5,692	65 45	47 06	18 39	82·6
C	10	4,994	57 43	40 32	18 61	80·7
D	8	5,187	59 65	39 85	19 80	76·8
E	19	4,111	47 27	31 70	15 57	77·1
F	14	4,233	48 67	31 76	16 91	75·0
G	7	6,700	77 05	47 96	29 09	71·5
H	10	4,622	53 15	31 48	21 67	68·1
I	9	4,707	54 13	29 65	25 48	62·5

Again it is seen that the low yield of milk (3,831 pounds) is the expensive milk, costing, 84·9 cents per 100 pounds for feed, while the average profit per cow for all of the thirteen in the herd is only $11.88.

Large profits per cow may come from high feed costs.

Probably a more careful study of the individualities of the cows in herd B would result in a larger profit than $18.39 from feed valued at $47.06.

Dairy records aid in the selection of cows that are economical producers and that give large profits.

TABLE 16.—Contrasts between Four of the Best and Four of the Poorer Herds in Cornwall, Ont., Dairy Record Centre.

FOUR BEST HERDS.

Herd No.	No. of Cows.	Pounds of Milk per Cow.	Returns per Cow at $1.10 for Milk.	Cost of Feed per Cow.	Net Profit per Cow.	Total Profit from Herd.
			$ cts.	$ cts.	$ cts.	$ cts.
A	9	6,052	66 57	28 99	37 58	338 22
B	10	6,113	67 24	30 07	37 17	371 70
C	12	5,995	65 94	29 40	36 54	448 48
D	12	5,588	61 49	29 66	31 83	381 96
Total	43					1,540 36

FOUR POORER HERDS.

			$ cts.	$ cts.	$ cts.	$ cts.
A	8	4,627	50 89	35 68	15 21	121 68
B	14	4,961	54 57	39 61	14 96	209 44
C	13	3,830	42 13	30 56	11 57	150 41
D	15	5,344	58 78	49 82	8 96	134 40
Total	50					615 93

The forty-three cows of the best herds show a total net profit of $1,540.36, while fifty cows (seven more) of the poorer herds show a total profit of only $615.93.

(Cost of feed taken from actual feed records handed in each month.)

TABLE 17.—Showing Typical Differences in the Earning Capacity between Cows in the Same Herd. Listowel, Ont., Dairy Record Centre.

Herd No.	Average Yield of Milk per Cow.	Value of Milk	Value of Feed	Feed Cost per 100 pounds Milk	Net Profit per Cow.
	Pounds.	$ cts.	$ cts.	$ cts.	$ cts.
1. Best cow	6,640	76 30	40 09	·60	36 21
Poorest cow	4,367	50 22	36 49	·83	13 73
2. Best cow	6,411	75 64	42 77	·67	32 87
Poorest cow	5,079	59 93	42 50	·83	17 41
3. Best cow	5,900	67 85	36 94	·62	30 91
Poorest cow	4,299	49 43	36 18	·84	13 25

From this table it appears that even where the lowest yield of milk is as much as 4,000 pounds, the fact of that type of cow consuming as much feed as a heavier producer pulls her profit down considerably.

The net profits of $13 and $30 given by the two cows in herd 3 mean that one cow is more than twice as valuable as the other as a profit maker.

TABLE 18.—Comparisons at Listowel, Ont., Dairy Record Centre.

SIX OF THE BEST HERDS.

Herd No.	No. of Cows.	Average Yield per Cow.	Average Yield per Cow.	Returns per Cow Milk at $1.10 cwt.	Cost of Feed per Cow.	Net Profit per Cow.	Cost of Producing 100 pounds of Milk.
		Lb. Milk.	Lb. Fat.	$ cts.	$ cts.	$ cts.	Cts.
A	10	9,081	299·4	99 89	62 35	37 54	68·6
B	8	11,097	371·3	122 06	60 04	62 02	54·1
C	13	8,459	271·4	93 04	50 50	42 94	59·7
D	16	8,472	272·8	93 19	45 25	47 94	53·2
E	10	8,276	265·6	91 03	53 90	38 13	63·9
F	12	8,391	274·8	92 30	49 70	42 60	59·2
Average	69	8,819	287·0	97 00	52 73	44 27	59·7

SEVEN OF THE POORER HERDS.

A	8	5,773	194·5	63 50	47 50	16 00	82·2
B	13	5,063	177·2	62 54	48 08	14 46	84·2
C	10	4,762	164·3	52 48	36 19	16 29	75 9
D	11	5,583	185·5	61 41	42 95	18 46	76·9
E	9	4,490	149·7	49 39	45 55	3 84	$1.01
F	10	5,197	194·1	57 16	45 03	12 16	86·7
G	12	5,853	199·0	64 98	38 16	26 82	65·1
Average	73	5,369	181·1	59 05	43 25	15 80	80·5

The sixty-nine cows in the six herds produced 608,578 pounds of milk and 19,805 pounds of fat, worth $6,694.35.

The seventy-three cows in the seven herds produced 391,872 pounds of milk and 13,220 pounds of fat, worth $4,310.59.

Is it not self-evident that every farmer should know whether a cow produces milk at 54 cents or $1.01 per 100 pounds?

TABLE 19.—Comparisons at North Gower, Ont., Dairy Record Centre.

FOUR OF THE BEST HERDS.

Herd No.	No. of Cows.	Pounds of Milk per Cow.	Value of Milk at $1.10.	Cost of Feed per Cow.	Profit per Cow.	Cost of producing 100 pounds of Milk.
			$ cts.	$ cts.	$ cts.	Cts.
A	11	6,152	67 67	30 30	37 37	49
B	8	6,735	74 08	40 52	33 56	60
C	7	5,991	65 90	37 72	28 18	62
D	10	5,938	65 31	36 28	29 06	61
E	14	5,927	65 19	37 00	28 19	62
Total	50	6,117	67 28	36 04	31 24	58

FIVE OF THE POORER HERDS.

A	11	4,383	48 45	37 00	11 45	84
B	12	4,164	45 80	33 72	12 08	80
C	9	4,259	46 85	37 67	9 17	88
D	14	4,670	51 37	34 99	16 74	74
E	13	4,705	51 75	32 00	19 75	68
Total	59	4,460	49 06	34 86	14 20	78

The fifty cows which comprised the six best herds gave 305,861 pounds of milk, worth $3,364.47; while the fifty-nine cows which made up the five poorer herds gave only 263,130 pounds, worth $2,894.43. The cost of feed for above tables is computed from monthly feed records handed to the recorder each month by the farmers.

TABLE 20.—Some of the Best and Poorest Herds at Oxford Mills, Ontario, Dairy Record Centre.

SIX GOOD HERDS.

Herds.	No. of Cows.	Average Pounds of Milk per Cow.	Cash Returns per Cow at $1.10 per 100 pounds.	Cost of Feed per Cow.	Profit per Cow.	Cost of Producing 100 pounds of Milk.
			$ cts.	$ cts.	$ cts.	Cts.
A	2	8,845	97 29	58 05	39 14	64
B	16	7,890	86 79	50 87	35 92	64
C	10	7,783	85 61	50 00	35 61	64
D	9	7,801	85 80	47 00	38 80	60
E	11	7,900	86 90	44 00	42 90	55
F	15	7,700	84 70	44 00	40 70	57
Average	63	7,847	86 31	46 62	39 69	59

SIX POORER HERDS.

A	11	3,103	34 13	30 10	4 03	97
B	6	4,435	48 78	35 00	13 78	78
C	12	5,255	57 80	40 80	17 00	77
D	16	4,767	52 44	35 36	17 08	74
E	16	4,968	54 64	39 45	15 19	79
F	13	4,763	52 39	37 00	15 39	78
Average	74	4,615	50 76	36 74	14 02	79

With feed averaging $9.88 per cow more, the cows in the six good herds produced milk at 20 cents per hundred less cost.

The sixty-three cows which comprised the six better herds produced 494,371 pounds of milk worth, at $1.10 per 100 pounds, $5,438.08.

The seventy-four cows in the six poorer herds produced only 341,567 pounds of milk worth, at the same price, $3,767.23, a difference in favour of the better cows of just $1,670.85.

TABLE 21.—Typical Contrasts between the 100 Best Cows and the 100 Poorest Cows in Four Districts.

ST. AUBERT, QUE., DAIRY RECORD CENTRE.

Yield of	Average Milk Yield.	Value at $1.10 per 100 pounds	Estimated Cost of Feed per Cow.	Feed Cost per 100 pounds Milk.	Profit per Cow.
	Pounds.	$ cts.	$ cts.	cts.	$ cts.
100 Best cows	4,841	53 25	23 44	·48	29 81
100 Poorest cows	2,690	29 59	20 45	·76	9 14
Difference	2,151	23 66	2 99	·27	20 67

MONTMAGNY, QUE., DAIRY RECORD CENTRE.

100 Best cows	5,407	59 47	33 86	·63	25 61
100 Poorest cows	2,591	28 50	26 96	1 05	1 54
Difference	2,816	30 97	6 90	·41	24 07

ST. HYACINTHE, QUE., DAIRY RECORD CENTRE.

100 Best cows	7,343	80 77	42 00	·57	38 79
100 Poorest cows	3,258	35 83	32 00	·95	3 83
Difference	4,085	44 94	10 00	·37	34 96

STE. HENEDINE, QUE., DAIRY RECORD CENTRE.

100 Best cows	5,220	57 42	34 00	·65	23 42
100 Poorest cows	3,077	33 84	26 00	·84	7 84
Difference	2,143	23 58	8 00	·19	15 58

The difference in the profit made per cow in these four groups is noteworthy. Thus at Montmagny, Que., for instance, each one of the best cows makes as much profit as sixteen of the poorest.

TABLE 22.—Average Pounds of Milk and Butter Fat, and Profit in Twenty-Six Herds at St. Joseph Dairy Record Centre, New Brunswick. (Profits do not include the value of skim milk).

THIRTEEN GOOD HERDS.

	Pounds of Milk.	Pounds of Fat.	Cost of Feed.	Profit.
			$ cts.	$ cts.
Average of 13 herds	5,002	207.4	38 55	17 11
" Best herd	6,730	318.2	47 50	38 41
" Poorest herd	3,291	132.3	29 00	6 72
" Best cow in each herd	8,570	444.6	47 50	72 54
" Poorest cow in each herd	3,650	135.2	50 53	*14 03

THIRTEEN POOR HERDS.

Average of 13 herds	2,624	98.9	27 10	* 06
" Best herd	2,922	102.7	25 00	2 75
" Poorest herd	2,054	77.0	27 00	* 6 21
" Best cow in each herd	4,100	157.9	25 50	17 13
" Poorest cow in each herd	1,930	66.2	37 25	*19 38

*Loss.

The keeping of dairy records will point unerringly to the profitable cows. In the light of these remarkable contrasts, surely there is inspiration for obtaining substantial profit. Why should any cow be kept at *a loss*, when $72.54 profit is being obtained?

TABLE 23.—Average Pounds of Milk and Butter Fat, and Profit in Eleven Herds at Sussex Dairy Record Centre, New Brunswick. (Profits do not include value of skim-milk).

	Pounds of milk.	Pounds of fat.	Cost of feed.	Profit.
			$ cts.	$ cts.
Average of Eleven herds	4,685	207.6	44 26	16 08
" Best herd	4,744	234.9	43 50	24 60
" Poorest herd	3,113	145.1	45 48	6 11
" Best cow in each herd	9,420	390.7	65 25	47 32
" Poorest cow in each herd	4,080	163.4	50 78	*18 60

*Loss

With individual records of 9,420 pounds of milk, there is every encouragement for men whose cows give only 1,930 pounds, (as in table 22.)

TABLE 24.—Average Pounds of Milk and Butter Fat, and Profit in Ten Herds at Scotsburn, N.S., Dairy Record Centre. (Profits given do not include the value of the skim-milk).

	Pounds of milk.	Pounds of fat.	Cost of of feed.	Profit.
			$ cts.	$ cts
Average of Ten herds	5,471	241·6	44 64	26 35
" Best herd	5,978	297·0	40 34	50 89
" Poorest herd	4,497	200·5	55 05	2 40
" Best cow in each herd	6,759	305·2	44 64	40 25
" Poorest cow in each herd	4,356	190·9	44 64	15 18

A profit of only $2.40 per cow in 365 days does not look very remunerative, especially when a neighbour is obtaining $50.89.

The record of a herd at Penobsquis in the Sussex, N.B., Dairy Record Centre is of interest.

The average yield of nineteen cows is 5,012 pounds of milk and 244 pounds of fat; with feed valued at $35.36, the average profit per cow above cost of feed is $22.85. The lowest profit made by any one cow is $6.69, and the highest profit $35.51. *Each cow in the herd makes a fair profit.*

A decided contrast between two herds of seven cows each is found at Scotsburn, N.S., Dairy Record Centre.

Herd A has an average yield of 7,255 pounds of milk and 342 pounds of fat, with a clear profit above cost of feed (valued at $54.86) of $46.86 per cow.

Herd B has an average yield of 5,978 pounds of milk and 297 pounds of fat, but shows a clear profit above cost of feed (valued at $55.05) of only $2.40 per cow.

In other words, each cow in herd A makes as much net profit as *nineteen* of those in herd B.

TABLE 25.—Comparisons in Six Herds at Kensington, P.E.I., Dairy Record Centre.

Herd No.	Cows.	Pounds of milk.	Pounds of fat.	Price for for fat.	Average Cost of Feed.	Profit.
				cts.	$ cts.	$ cts.
1	Ten cows	6,611	270·0	29·1	35 11	43 46
	Best cow	7,903	322·8	29·1	35 11	58 82
	Poorest cow	4,800	167·2	28·1	35 11	13 54
2	Eight cows	5,867	236·1	30	33 22	35 81
	Best cow	7,874	325·2	30	33 22	64 34
	Poorest cow	5,033	198·3	30	33 22	26 27
3	Five cows	6,033	236·9	30·25	41 60	30 06
	Best cow	7,401	283·8	30·25	41 60	44 25
	Poorest cow	4,974	179·0	30·25	41 60	12 54
4	Four cows	4,395	177·3	30	26 00	27 19
	Best cow	5,825	210·2	30	26 00	37 06
	Poorest cow	3,334	133·8	30	26 00	14 14
5	Eight cows	6,412	243·1	28	49 12	18 94
	Best cow	7,809	320·1	28	49 12	40 50
	Poorest cow	5,053	203·6	28	49 12	7 88
6	Eight cows	3,786	134·5	28	27 37	10 29
	Best cow	4,583	179·0	28	27 37	22 75
	Poorest cow	3,233	106·1	28	27 37	2 97

It will be noticed in the above table that the average profit for any one of these six herds varies from $10.29 up to $43.46 per cow. Between the highest profit ($64.34) made by one cow and the lowest ($2.97) there is an extraordinary difference; *one cow making as much profit as twenty-one.*

PURE-BRED DAIRY SIRES.

TABLE 26.—Comparison of a few Herds Showing the Value of a Pure-bred Sire at Oxford Mills, Ont., Dairy Record Centre.

Grade Sire.				Pure-bred Sire.			
Herd No.	No. of cows.	Total pounds of milk from the herd.	Average pounds of milk per cow.	Herd No.	No. of cows.	Total pounds of milk from the herd.	Average pounds of milk per cow.
1	6	27,210	4,535	1	11	73,139	6,649
2	14	63,490	4,535	2	10	72,700	7,270
3	16	76,285	4,767	3	16	126,241	7,889
4	11	60,473	5,497	4	13	93,304	7,177
5	7	33,026	4,718	5	7	49,224	7,032
6	13	36,575	3,325	6	6	70,209	7,801
7	11	33,110	3,010	7	11	64,394	5,854
8	6	26,610	4,435	8	10	77,830	7,783
Total	84	356,779	4,247		84	627,041	7,464

The eighty-four cows in herds headed by pure-bred sires give actually 270,262 pounds of milk more.

TABLE 27.—Ways Mills, Que., Dairy Record Centre.

GRADE SIRE.					PURE-BRED SIRE.				
Herd No.	No. of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.	Value at 30cts. per lb.	Herd No.	No. of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.	Value at 30 cts. per lb.
A.....	13	3,835	124·9	$37 47	A.....	21	6,458	302·6	$90 78
B.....	18	2,918	133·6	40 08	B.....	22	4,949	200·5	60 15
C.....	18	3,746	133·0	39 90	C.....	15	5,112	205·3	61 59
D.....	15	4,154	166·8	50 04	D.....	19	5,170	295·5	88 65
E.....	9	3,548	127·3	38 19	E.....	13	5,[illegible]	226·7	68 01
F.....	8	4,228	154·4	46 32	F.....	13	5,100	238·2	71 46
Total..	81	3,738	140·0	$42 00	.....	103	5,342	244·8	73 44

In the herds headed by a pure-bred sire the average income per cow is $73.44, or *$31.44 more* per cow.

TABLE 28.—St. Hyacinthe, Que., Dairy Record Centre.

GRADE SIRE.					PURE-BRED SIRE.				
Herd No.	No. of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.	Value at 30 cts. per lb.	Herd No.	No. of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.	Value at 30 cts. per lb.
A.....	11	3,784	151·9	$45 57	A.....	10	7,611	281·0	$84 30
B.....	11	2,995	141·6	42 48	B.....	10	6,955	283·8	84 84
C.....	8	3,717	137·7	41 31	C.....	11	6,642	278·0	83 40
D.....	9	3,367	132·7	39 81	D.....	8	5,077	228·3	68 49
E.....	11	3,655	145·4	43 62	E.....	11	9,169	329·8	98 94
Totals...	50	174,934	6,934·2	$2,080 26	.....	50	360,201	14,160·3	$4,248 09

From these three tables showing returns in herds at three dairy record centres, it is immediately apparent that the value of a pure-bred dairy sire on the average grade herd is of immense importance.

At St. Hyacinthe, Que., for example, the difference between the two lots of fifty cows is an *additional* yield of 185,267 pounds of milk. In other words the influence of the pure-bred sire is largely responsible for an *increased yield* of 3,705 pounds of milk per cow.

SOME SAMPLE INCREASES IN YIELD OF MILK PER COW.

At Oxford Mills, Ont., the average increase of 165 cows in fourteen herds between 1912 and 1914 is 833 pounds of milk per cow.

At Listowel, Ont., there are twenty-six herds showing good increases, many of them over 1,300 pounds of milk and 44 pounds of fat per cow.

At Frankford, Ont., the average increase in ten herds between 1912 and 1914 is 1,655 pounds of milk and 67 pounds of fat per cow.

At Avonmore, Ont., nine herds show substantial increases: one herd of twelve cows is now up to an average of 7,982 pounds of milk per cow, compared with only 6,200 pounds, or an increase of 1,782 pounds per cow.

At Mallorytown, Ont., a herd of twelve cows has increased from 3,726 pounds of milk per cow in 1909 to 7,388 pounds in 1914. This is an increase of 3,662 pounds of milk per cow, or 98 per cent.

At St. Hyacinthe, Que., the increase of 156 cows in fifteen herds after three years amounts to the total value of $2,232.72.

There are twenty herds at Scotsburn, N.S., that show extraordinary increases in the last six years, some as high as 200 per cent. Yields that were undreamed of by men who were more interested in lumbering than dairying are now used as stepping stones to still better results.

At St. Prosper, Que., are fourteen herds that show good increases since 1912. For instance, in one herd the average yield per cow in 1912 was 4,644 pounds of milk, 5,984 pounds in 1913, and 6,454 pounds in 1914. This is an increase of 1,810 pounds of milk per cow, or 38 per cent.

An example of good steady herd improvement, full of encouragement for every dairyman, comes from Frankford, Ont. The yield of each cow for three consecutive years is shown.

1912.		1913.		1914.	
Pounds milk.	Pounds fat.	Pounds milk.	Pounds fat.	Pounds milk.	Pounds fat.
6,720	226·4	7,799	272·5	8,338	279·1
6,572	207·0	6,580	223·5	7,189	254·6
5,392	179·7	6,005	229·5	7,531	254·3
5,917	195·2	6,430	223·6	6,825	241·4
6,102	193·6	6,404	210·0	6,416	218·1
6,660	213·7	6,420	219·9	7,384	259·8
6,767	201·5	7,509	254·3	8,100	278·3
4,892	162·4	6,665	215·3	8,163	266·3
3,552	102·8	6,065	208·5	7,889	257·0
5,235	191·0	. . . . .	. . . . .	6,528	237·6
Total yield.57,809	1,874·3	59,777	2,057·1	74,363	2,546·5

In 1912, the average yield per cow was 5,780 pounds milk, 3·2 test, 187·4 pounds fat.
In 1913, " " 6,644 " 3·8 " 228·5 "
In 1914, " " 7,436 " 3·4 " 254·6 "

Increase from 1912 to 1913, per cow, 864 pounds milk, 41·1 pounds fat.
" 1913 " 1914, " 795 " 26·1 "
" 1912 " 1914, " 1,656 " 67·2 "

The owner of this herd states he is more than pleased with the work, he is aiming for at least 9,000 pounds of milk and 300 pounds of fat per cow.

CHAS. F. WHITLEY.

OTTAWA, March 31, 1915.

APPENDIX V.

DAIRY HERD RECORDS IN ONTARIO.

During 1914 the dairy herd record movement was conducted on the same general plan as in former years. Fifteen record centres were in operation, the following being a list of the same together with the name of the recorder in charge and the county in which the centre is situated:—

Centre.	Recorder.	County.
Listowel	Jas. R. Burgess	Perth.
Ingersoll	Ed. J. McMulkin	Oxford.
Frankford	J. B. Lowery	Hastings.
Peterborough	Wm. Weir	Peterborough.
Kingston	H. B. Smith	Frontenac.
Mallorytown	J. C. Raphael	Leeds.
Oxford Mills	Freeman Brown	Grenville.
Avonmore	Alfred Street	Stormont.
Alexandria	Allan Macdonell	Glengarry.
Perth	W. W. Echlin	Lanark.
North Gower	Thos. J. Hicks	Carleton.
*Cornwall	A. L. Andress	Stormont.
*Hallville	J. E. Dougall	Dundas.
*Renfrew	D. Muirhead	Renfrew.
*Sunderland	Jas. Glendinning	Ontario.

*Being operated in 1914.

In addition to the above, records were received from several associations, as well as from a considerable number of individual dairymen in various parts of the province. Records of 7,522 cows, comprising 760 herds, passed through the recorders' hands, the total number of tests made being 57,239. It may be mentioned here that these figures do not fully represent the extent of the cow testing or herd record work in Ontario, as a large number of farmers are keeping private records upon forms supplied by the Dairy Division, copies of which are not forwarded to the department.

Dairy herd records are yearly becoming more popular among progressive dairymen, and through their successes the interest of the more indifferent is being slowly aroused.

One of the greatest obstacles to the more general adoption of cow testing by farmers is the lack of properly qualified and sufficiently interested persons to do the testing. It has always seemed to the writer that if this work is ever to be made general, it must be done through the medium of the cheese and buttermakers. The cheese factory or creamery is a natural centre for such work. Unfortunately, a very large percentage of the makers are either unable to test milk, or are not sufficiently interested to bother with it. Many factories are not equipped with testing outfits. These conditions prevent many farmers from reaping the benefits of the work. In practically every community are to be found men who are ready to keep records and samples, were they only provided with means of having the testing properly done. Occasionally farmers are found who do their own testing, which is an ideal way of carrying on this work, as it furnishes a pleasant diversion from the routine duties of the farm, and has a tendency to develop self-reliance and independence.

The continuance of the widespread practice of paying for milk in cheese factories by the "pooling system" is another factor which tends to retard the practice of testing the individual cows. "What use is it when I am paid for my milk by the hundred?" is the pointed question frequently asked. Lack of dependable farm help is another excuse offered by very many farmers for not taking up the work.

It may not be out of place here to mention the milking machine and its probable effect upon the keeping of herd records. Some machines milk two cows into one receptacle, and it is therefore impossible to get the weight, or a sample of each cow's milk. Even if the milk is drawn into a separate vessel from each cow, the fact that many cows have to be "stripped" or finished by hand after the machine, makes the getting of the proper weight and a representative sample of each cow's milk somewhat difficult, and frequently leads to mistakes. Some men have discontinued keeping records after installing milking machines. Others have resorted to hand milking for the days upon which weights and samples are being taken, rather than be deprived of accurate records of their individual cows. The manufacturers of mechanical milkers will do well to consider some solution of this apparent difficulty.

Breeding and selection are important factors in the building up of a dairy herd, and it is encouraging to note an increasing demand for pure-bred sires, and also that more buyers are asking for animals which are backed by reliable, official records, a precaution too frequently neglected in the past. This change in the attitude of buyers is due in no small measure to the efforts of the recorders and others in impressing upon dairymen the importance of record keeping, and to the assistance rendered in locating and selecting good sires. It is to be regretted that many good sires are disposed of for beef before their offspring have been proven or tested; while on the other hand, many poor sires are not sent to the block soon enough. It is a mistake not to test the heifers at the first opportunity.

Many of the members of the record centres who are keeping pure-bred cattle have become interested in official records, and in not a few cases has cow testing proved the stepping stone to the Record of Performance and other official tests.

Continued improvement is shown in the dairy stables throughout Ontario, many new stables being comfortable and well lighted; but, unfortunately, in too large a proportion of cases no attention has been paid to any system of ventilation, the natural result being that a large number of stables otherwise first-class are stuffy and foul smelling, which cannot but be detrimental to the health and productive ability of the cows, as well as to the quality of the milk produced.

While there is evidence of considerable improvement from the standpoint of production among the cows of Ontario, it might be well to point out some of the weaknesses in herd management as practiced among the dairy farmers of this province. Generally speaking, we are not growing milk-producing foods in large enough quantities. A large percentage of cows are underfed during the winter months, and the result is that very many herds are turned out in the spring in poorer condition than when stabled in the fall; consequently, the maximum flow of milk is much lower and extends over a shorter period than it otherwise would. That it pays to feed liberally is proven by our dairy census figures, where almost invariably it is found that the greater the cost of feed per cow, the less the cost of producing 100 pounds of milk or 1 pound of fat.

The recorders have been active in encouraging the holding of dairy contests at rural fall fairs. Considerable success has attended their efforts, and much interest has been taken by dairymen and the general public in this new feature. Dairy contests were held last year at Woodstock, Renfrew, Perth, Alexandria,

Belleville, Frankford, and Peterborough. Already preparation is being made by several other fair boards to hold similar contests at the coming autumn exhibitions.

The recorders are sometimes inclined to be discouraged at the comparatively small percentage of dairymen who can be persuaded to take up record keeping. They meet with further disappointment when a number of those who do start fail to continue and, for one reason and another, drop out at or before the end of their first year. However, the outlook at present is more encouraging and indicates that 1915 will see substantial additions to the ranks of record-keeping dairymen. One noteworthy feature is that some who dropped out a year or two ago are starting in again, having realized that they made a mistake in discontinuing.

By no magic wave of the hand can poor cows be turned into good cows. It takes time, patience, and good judgment to build up and maintain a herd of cows, the individuals of which are producers of big profits.

H. W. COLEMAN.

Supervisor of Cow Testing for Ontario.

PERTH, ONT., March 31, 1915.

APPENDIX VI.

DAIRY HERD RECORDS IN QUEBEC.

I have the pleasure to present my first report as supervisor of cow-testing work in Quebec. This report covers a period of fifteen months, from the 1st of January, 1914, when I took up my present duties, to the 31st of March of this year.

I hesitated at first to undertake the work on account of the difficulties which had to be overcome, but I made up my mind to do so after a careful study of its possibilities, and of the results obtained in this country and also in foreign countries like Denmark and Switzerland. I decided to put all my energy into the work and I have found it very interesting and satisfactory; interesting, because I am convinced that cow-testing will greatly increase the profits of the farmers of Quebec, and give a new impetus to dairying; satisfactory, because the number of men testing their cows has markedly increased. Four new record centres were established in 1914, viz., in the counties of L'Islet, Montmagny, Bellechasse, and Lac St. Jean, in addition to the six centres previously organized. The complete list was as follows:—

Location.	Recorder.	P. O. Address.
L'Islet	A. Tremblay	St. Aubert.
Montmagny	L. E. Côté	Montmagny.
Bellechasse	J. S. Cinq Mars	St. Raphael
Lac St. Jean	J. E. Hadon	Metabetchouan.
St. Hyacinthe	A. Hamel	St. Hyacinthe.
Champlain	F. X. Trudel	St. Prosper.
Stanstead	F. J. Wilkinson	Way's Mills.
Pontiac	R. W. Hodgins	Shawville.
Dorchester	A. Lavallee	Ste. Claire.
Beauce	A. Laborte	St. Georges Est.

There are, in addition to the ten record centres, thirty cow testing associations where the testing is being done by the owner or manager of the local cheese factory or creamery. There are 164 members in these small associations, and the number of cows under test is 1,689.

The results of the cow-testing work, which I have studied in the various districts in order to prepare this report, show that the people are well pleased everywhere. They are quite ready to go on with the work which has already proved to be profitable, and we can confidently expect a large number of new members in all the centres, and several new associations will be organized.

Judging by the requests for information received from the farmers, the factory owners, and the cheese and butter-makers, there is a growing interest in the cow-testing work. This is due to the general propaganda, the results obtained by the first members, the good work of the recorders, and the attention given to this question by the St. Hyacinthe dairy school, the schools of agriculture at Ste. Anne de la Pocatière and Oka, and the domestic science schools at

Roberval and St. Paschal. I was invited to visit all these institutions, for the purpose of advocating cow-testing which subject is now a regular item of the programme in class and practical work. It is also taught by the agricultural missionaries of Quebec.

A milking competition was organized this year by the Quebec Exhibition Association, and the competition which has been so popular at the Sherbrooke exhibition for a number of years, was conducted as usual with the assistance of F. J. Wilkinson, of the Stanstead record centre. The cow-testing work has also been included in the experimental programme of the Junior Farmers' Association for 1915. To all these we give our best thanks. Their valuable co-operation gives me the hope that great results will be achieved in agriculture and dairying by means of this movement.

The Quebec recorders, in addition to their regular work, made themselves useful by helping the farmers: (*a*) to improve their herds by a better system of breeding, and (*b*) to increase their profits by more judicious feeding, with a greater variety of and better-balanced rations. They keep continually in touch with the Experimental Farms, and being well informed and earnest men, they can make themselves useful in a thousand different ways, by calling attention to many different things.

Cow-testing has also greatly helped the French Acadians of Nova Scotia at Clare and Meteghan in Digby county. The rapid development of the dairy industry in that part of the country is really wonderful, considering the difficulties encountered.

My ambition is that the province of Quebec should have as large a number of cow-testing dairymen as Ontario, and an average yield of milk, fat, and money per cow, not only equal but superior, if possible.

J. B. E. TRUDEL,

Supervisor of Cow Testing for Quebec.

Lac à la Tortue, Que., March 31, 1915.

APPENDIX VII.

DAIRY HERD RECORDS IN THE MARITIME PROVINCES.

This work continues to expand with excellent results in the dairy record centres previously established, and a good start made with bright prospects for future development in the three new centres opened at Crapaud, Truro and Antigonish. A greater interest is being taken in the weeding out of unprofitable cows, the care and feeding, also improved breeding through the use of pure-bred sires. A number of sections will have an opportunity this year for the first time to use pure-bred sires from Record of Performance dams. The results in some sections from the use of *registered pure-bred scrub bulls* have been detrimental to the work of herd improvement; this is an evil some breeders of pure-bred stock should take note of and apply the remedy.

The creameries on Prince Edward Island that have co-operated with us in forwarding the work by offering prizes to their patrons making the highest averages of butter-fat per cow, are evidently satisfied with the results, as the prizes are offered again this year, and at one creamery the amount provided is double that of last year.

The Provincial Department of Agriculture in Nova Scotia is assisting in extending the work, and is providing Babcock testers free to any student from the Agricultural College, Truro, residing in the province, who is in a position to take up cow testing in his local district.

The Provincial Department of Agriculture in New Brunswick is also offering assistance this season by furnishing outfits and defraying expenses in connection with collecting samples at outlying sections in the Woodstock district.

As an indication of the increased interest in the work, we have received a great many petitions, in some cases containing signatures of over sixty farmers, also from agricultural societies and farmers' clubs asking for record centres in new districts. We have been able to make provision to carry on the work in many of these districts by extending the centres already established, and arranging with qualified creamery-men and others to assist the recorders in doing the testing.

The following figures taken from the secretary's books at one of our largest cheese factories give a fair idea of what is being done under average conditions:—

AVERAGE Milk and Butter-fat per cow delivered to Cheese Factory. June 1 to October 31 in 1912-13-14, by two patrons who are cow-testing.

Herds.	1914			1913			1912		
	Number Cows.	Average Milk.	Average Fat.	Number Cows.	Average Milk.	Average Fat.	Number Cows.	Average Milk.	Average Fat.
		lb.	lb.		lb.	lb.		lb.	lb.
A	5	6,092	231·96	5	5,412	202·64	5	5,100	193·25
B	11	4,118	160·87	10	3,561	141·25	9	3,543	136·19

In herd A we have an increase of 992 pounds of milk and 58·71 pounds of butter-fat per cow in the three years: with fat at 27 cents per pound this gave the owner an increased return of $47.25 from his five cows. Herd B shows an increase of 575 pounds of milk and 24.68 pounds of butter-fat per cow; this gave him an increased return from his herd of $73.29.

Every dairyman can make the same increase in his returns by making use of the information he can acquire through cow-testing.

I have devoted some time to starting new cream routes in Prince Edward Island and assisting Mr. McKay, Dairy Superintendent for Nova Scotia, in new creamery districts. The new creamery at Wellington, P.E.I., did a good business handling cream from about one hundred farmers, and the Dunstaffnage central creamery have about doubled their output in the last two years through cream coming in via rail from routes organized in the eastern end of the island, where it has been found unprofitable to operate small cheese factories. Over one hundred new patrons, well pleased with the returns they received, will have a good influence on this branch of the work for next season.

The new creameries at Baddeck, Stellarton, and Bridgewater, in Nova Scotia, did a good business; the two latter continued to make butter during the winter, something unusual for a new creamery the first year, in the Maritime Provinces.

My work in New Brunswick was confined entirely to cow-testing.

There has been a decided increase in the output of creamery butter and a slight falling off in the make of cheese in the three provinces during the year.

HARVEY MITCHELL.

CHARLOTTETOWN, P. E. I., March 31, 1915.

APPENDIX VIII.

REPORT OF THE COLD STORAGE INSPECTOR.

The Cold Storage industry in Canada has developed to such an extent that there are now some 128 warehouses, with approximately 25,000,000 cubic feet of refrigerated space available in public and private warehouses. This does not include refrigerating installations in retail stores or butcher shops, provision, fruit, fish stores, and dairies, which are quite numerous in cities and towns all over the Dominion.

Under the Cold Storage Act, of 1907 subsidies to the extent of 30 per cent of the cost of constructing and equipping warehouses have been given to companies or individuals in every province, and public warehouses have been erected in communities where cold storage facilities were very much needed.

As inspector of subsidized warehouses, it has been my duty to visit all plants at least once, and many of them several times during the year. I am pleased to report that as a general thing these warehouses are maintained in a high state of efficiency and with one or two exceptions where conditions might be improved, the public are receiving an excellent service in the storage of all kinds of produce. A large percentage of the warehouses are operated at one-half to full capacity, while several have been forced to enlarge their cold storage space and, in some cases, their equipment to accommodate the increasing business.

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The following is a complete list of subsidized cold storage warehouses erected since 1907:—

Name.	Total Refrigerated Space.	Cost.	Total Subsidies.
	Cu. ft.	$	$
Alberta.			
Campbell & Hamilton, Calgary	111,050	90,000 00	27,000 00
Edmonton C. S. Company, Edmonton	150,056	152,000 00	45,600 00
British Columbia—			
Lee B. Wilson Co., Victoria	[illegible]	75,000 00	22,500 00
The Canadian Fish and C. S. Co., Prince Rupert	781,000	[illegible]	105,000 00
H. & K. Trading Co., Penticton	32,164	33,000 00	9,900 00
Manitoba—			
The Brandon City and Suburban Ry. Co., Brandon	27,500	32,000 00	9,600 00
New Brunswick—			
The New Brunswick C. S. Co., St. John	744,000	167,000 00	50,100 00
Cold Storage Limited, Woodstock	[illegible]	25,577 00	7,673 10
Nova Scotia—			
The Lockport C. S. Co., Lockport	59,940	56,850 18	17,055 05
Northumberland Fisheries, Pt. Hawkesbury	338,550	200,000 00	60,000 00
The Halifax C. S. Co., Pt. Hawkesbury	75,000	30,386 69	9,115 99
The Halifax C. S. Co., Pt. Hawkesbury (Burned 1913)			
Ontario—			
Scott & Hogg, Peterborough	90,000	14,500 00	4,350 00
The J. D. Moore Co., St. Marys	105,000	[illegible]	10,805 88
Lemon Bros., Owen Sound	33,600	20,000 00	6,000 00
The Chatham Fruit Growers Assn., Chatham	50,000	19,350 00	5,805 00
O'Keefe & Drew Abbatoir Co., Chatham	144,400	53,741 45	16,122 43
*The Palmerston C. S. Co., Palmerston	169,984	35,000 00	10,500 00
The Trenton Cooperage Mills, Ltd., Trenton	166,446	50,919 41	15,275 82
The St. Lawrence Produce Co., Brockville	106,000	52,000 00	15,600 00
Flavells Ltd., Lindsay	131,510	53,000 00	15,900 00
Gunns Ltd., Harriston	57,069	38,877 30	11,663 19
The St. Thomas C. S. Co., St. Thomas	174,141	123,700 00	37,110 00
The Brantford C. S. Co., Brantford	36,900	29,600 00	8,880 00
The Whyte Packing Co., Mitchell	30,600	21,000 00	6,300 00
Algoma Produce Co., Sault Ste. Marie	55,806	67,000 00	20,100 00
Prince Edward Island—			
Island C. S. Co., Charlettetown	150,000	50,000 00	15,000 00
Quebec—			
The Dominion Fish & Fruit Co., Quebec	225,000	[illegible]	66,852 96
J. H. Sansregret, Joliette	23,394	22,444 10	6,733 23
Saskatchewan—			
Moosejaw C. S. Co., Moosejaw	189,764	90,000 00	27,000 00
City C. S. Co., Regina	100,672	48,257 00	14,477 10
H. [illegible], Yorkton	24,000	22,450 00	6,735 00
	[illegible]	[illegible]	684,754 75

*Only one-half subsidy of $7,750 paid on Palmerston warehouse.

A contract was entered into with J. H. Early, Saskatoon, Sask., in 1913, which was afterwards assigned to the Saskatoon Cold Storage Company. The warehouse has not yet been completed and, on application of the company, an extension was granted, allowing them until October 1, 1915, to complete the warehouse. Further contracts have been entered into with R. H. Ashton, Morrisburg, Ont., for the erection of a warehouse at Morrisburg, Ont., and with Mathews and Scott, Queensport, N.S., for one at Sydney, N.S.

CREAMERY COLD STORAGE BONUSES.

There were fifty-four applications for creamery cold storage bonuses received during the year. Of this number, forty-five were approved and received the full bonus of $100. In the other nine cases the conditions were not complied with.

LIST of Creameries that Received the Bonus in 1914-15.

Name of Creamery.	Name of Proprietor, Secretary or Manager.	P.O. Address.	County.
Quebec.			
Ste. Victoire Village	J. Desjardins	Ste. Victoire	Richelieu.
St. Prosper	O. Lariviere	Quatre Chemins	Dorchester.
Wotton Village	E. Simoneau	Wotton	Wolfe.
Rang St. Pierre			
St. George Beauce	E. Maheu	St. Benoit Labre	Beauce.
Co-operative Society, St. Pierre Broughton Village	D. Roy	West Broughton	Megantic.
Bury	O. Lapalme	Bury	Compton.
St. Jean de Dieu Village	E. Dumont	St. Jean de Dieu	Temiscouata.
St. Robert	A. Brouillard	Bellevue Junction	Richelieu.
St. Mathieu Village	A. Belzile	St. Mathieu	Rimouski.
Ayer's Cliff	A. E. Fish	Ayer's Cliff	Stanstead.
St. Pierre les Becquets, Village	L. Sauvageau	St. Pierre les Becquets	Nicolet.
Saint Alexis, Rang St. Benoit	J. A. Gagnon	St. Benoit de Matapedia	Bonaventure.
St. Francois (Beauce)	P. Thibodeau	Riviere Gilbert Gold Mines	Beauce.
Rang Victoria	D. Rocheleau	St. Didace	Maskinonge.
Ste Flavie	J. Rioux	Mont Joli	Matane.
Ste. Luce	A. Roest	Neigette	Rimouski.
Cote de Roche	L. Amiot	Ste. Angele	Matane.
3rd Rang, Ste. Croix	D. Blouin	Potvin	Lotbiniere.
Rang St. Francois (Lotbinière)	E. Rivard	Paradis	Lotbinere.
St. Jean l'Evangeliste	J. A. Allard	Nouvelle West	Bonaventure.
Ste. Genevieve Village, north side	E. Jacob & Sons	Ste. Genevieve de Batiscan	Champlain.
St. Germain, Village	L. A. Levesque	St. Germain de Kamouraska	Kamouraska.
St. Omer	Rev. J. A. St. Laurent	St. Omer	Bonaventure.
(Petit Village St. Ephrem Beauce)	G. Thibodeau	Petit Village	Beauce.
No. 3 Syndicate Village	A. Bernier	Cap St. Ignace	Montmagny.
St. Honore de Shenley	A. Fortier	St. Honore	Beauce.
Sayabec, Village	L. Gagnon	Sayabec	Matane.
St. Victor de Tring Village	S. Fortin	St. Victor de Tring	Beauce.
(St. Joseph Range St. Francois Beauce	J. Thibodeau	Beauceville East	Beauce.
No. 1 Syndicate Village	N. Roy	Amqui	Matane.
Rang Ste. Marguerite	E. Poulin	St. Georges	Beauce.
Val Brillant, Village	A. A. Nicole	St. Simon	Rimouski.
St. Hubert	J. Ouellet	Lamy	Temiscouata.
Manitoba.			
Carberry	Carberry Cry. Co. W. Jardine	Carberry	Sec. 30, Tp. 10, R. 14, W. of 1st M.
Rapid City	Rapid City Cry. Assn. C. G. Murray	Rapid City	Sec. 20, Tp. 13, R. 12, W. of 4th M.
Saskatchewan.			
Bow City	Bow City Cry. Co. S. R. Wallace	Oxbow	Sec. 23, Tp. 3, R. 2, W. of 2nd M.
Cudworth	Cudworth Cry. Co. Chas. D. Spani	Cudworth	Sec. 31, Tp. 40, R. 26, W. of 2 nd M.

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List of Creameries that Received the Bonus in 1914-15—*Concluded.*

Name of Creamery.	Name of Proprietor, Secretary or Manager.	P. O. Address.	County.
New Brunswick.			
Madawaska	Maxime Albert...	Albertine.....	Madawaska
Evangeline	L. C. Daigle....	St. Louis.....	St. Hilaire Parish. Kent St. Louis Parish.
Nova Scotia.			
South River	The South River Cry. Co., John T. Keating.....	Loch Katrine.	Antigonishe.
Baddeck	Nova Scotia Dept of Agriculture, W. A. Mackay..	Baddeck.....	Victoria, C.B.
La Have	La Have Cry. Co...	Bridgewater.....	Lunenburg.
Pictou County Dairy	Pictou Co. Dairy Co., H. Falconer..	Stellarton.....	Pictou.
Cumberland Co-operative	Cumberland Co-operative Co., W. A. Landels.....	River Hebert...	Cumberland.
Prince Edward Island.			
Wellington	Wellington Dairy Co R. F. Gaudet...	Wellington....	Prince.

Bonuses paid since the year 1897—914 creameries have received a total of $82,625.25.

JOSEPH BURGESS,
Cold Storage Inspector.

Ottawa, March 31, 1915.

APPENDIX IX.

REPORT OF THE CHIEF INSPECTOR OF DAIRY PRODUCTS.

The inspection of dairy products has been carried on during the past year by a staff of six inspectors, five of whom were engaged in this work during only a part of the year.

Mr. R. G. L. Clarke, Chief Dominion Fruit Inspector for the province of British Columbia, devoted some time to the inspection of dairy products in that province.

Mr. Thos. E. Davis, of Winnipeg, was engaged in the inspection of dairy products throughout the provinces of Manitoba, Saskatchewan, and Alberta, from the beginning of the year until the latter part of November.

The late Mr. D. M. Macpherson, of Lancaster, Ont., spent the greater part of the time from the first of the year until he became ill in December, in inspection work in Ontario. After September 1, Mr. Macpherson gave special attention to the branding of dairy and whey butter. Mr. Macpherson also did some work in the city of Montreal.

Mr. J. G. Bouchard, of Ottawa, has, during the past year, devoted about four months' time to the work of inspection, the greater part of this time being spent in the city of Montreal.

Mr. L. P. Bernard, of Granby, Que., has given some assistance, particularly in the inspection of the branding of butter in Montreal.

The writer has, during the year, made two trips throughout the West, visiting all the principal cities in the four western provinces. Two trips of inspection have been made through the Maritime Provinces. The remainder of the writer's time has been spent on inspection work in Ontario and Quebec.

METHOD OF INSPECTION FOR ADULTERATION

The Dairy Industry Act requires that the fat of butter be genuine milk fat, and that the butter contain not more than 16 per cent of water. Butter containing fats other than milk fat, or more than 16 per cent of water is considered to be adulterated.

The percentage of water in butter may be determined fairly accurately by means of any one of several different mechanical appliances or testers which are on the market. One of these testers is carried by each inspector. In inspecting butter, samples of different brands are secured from manufacturers and from wholesale and retail merchants. Each sample when secured is placed in a glass jar and given a serial number. A report form, bearing the same number as the jar, is filled in, giving the names and addresses of the manufacturer and the vendor, the brand and the date of sale. The percentage of water in the sample is determined by the inspector on the same day that the sample is secured. If the percentage of water as shown by the inspector's test is in excess of sixteen, or if it is suspected that the butter is adulterated by foreign fats, two further samples are secured. About one-quarter pound of the suspected butter is placed in each of two screw-top glass jars which are securely sealed with wax and a seal provided by the department for this purpose. A label,

properly filled in to show the name of the vendor, place and date of sale, is gummed to each jar. One of these sealed jars containing a sample of the suspected butter is left with the vendor, in order that he may have an analysis made by an independent analyst, if he sees fit. The other sealed sample is taken by the inspector and, if the sample has been secured in Ontario or Quebec, it is submitted for analysis to the Inland Revenue Department at Ottawa. Samples taken for analyses in provinces other than Ontario and Quebec, are submitted to the provincial analyst of the province in which the samples are secured, or to some properly qualified city analyst.

All samples examined during the past year for adulteration by means of foreign fats have proved to be genuine.

When a sample suspected of containing over 16 per cent of water is submitted for analysis, and the findings of the analyst substantiate the results of the preliminary test of the inspector, a prosecution follows if the circumstances seem to warrant such a proceeding.

While a wholesale or a retail merchant is liable under the law for selling or having in his possession for sale, butter containing over 16 per cent of water, it does not necessarily follow that a prosecution is taken against such a vendor. As a general rule, a first prosecution is taken against the manufacturer only. If this prosecution against the manufacturer does not have the desired effect, and the butter continues to exceed the legal limit of water, further prosecutions would then be taken against as many vendors as possible, who handle this particular brand, as well as against the manufacturer. Proceeding against retail merchants in this manner is, for apparent reasons, most effective in preventing violations of the law by manufacturers.

Preliminary tests of 2,007 samples of butter have been made during the year. One hundred and eighty, or slightly less than 9 per cent of the samples tested contained over 16 per cent of water. The water content of these 180 samples varied from 16·1 per cent to 38·1 per cent.

When a sample of butter is found to contain more than 16 per cent of water, several other samples of the same brand are secured, if possible, to determine whether or not the water content of the particular brand is uniformly high. Thus of the 180 samples which exceeded 16 per cent, in several cases two or more tests were of the same brand.

Only occasionally is a sample of dairy butter found to contain over 16 per cent of water, and in such cases it is usually evident from the quality of the butter that the high water content is due to faulty methods of manufacture rather than to any intent to defraud; that is, the methods used in the making have not only incorporated a high percentage of water, but have ruined the body and texture of the butter. In such cases, the proper course would seem to be not to prosecute, but to instruct the maker how to overcome the difficulty by employing proper methods of manufacture. This has been done in all cases in which the maker was known.

Merchants who buy dairy butter from farmers cannot always say who has made a particular lot of butter which may be in their possession for sale. Since the merchant is responsible not only for the water content of the butter in his possession, but also for the weights of the blocks or prints, every merchant should, as a matter of self protection, devise some system of identifying the maker of all the butter which he handles.

Thirty-seven prosecutions on account of excess of water have been taken during the past year against manufacturers, wholesale and retail merchants, and convictions were secured in all cases. In all cases except one, fines varying from $10 to $200 together with costs of prosecution were imposed.

The extent to which the public may be defrauded by excess of water in butter is not properly appreciated by most consumers. Assuming that butter contains 16 per cent of water—the maximum allowed by law—and that such butter is selling at 30 cents a pound:—

If butter containing 16 per cent of water is worth 30c. a pound
Butter containing 20 per cent of water is worth only $28\frac{4}{10}$ cents a pound
Butter containing 25 per cent of water is worth only $26\frac{1}{10}$ cents a pound
Butter containing 30 per cent of water is worth only $24\frac{3}{10}$ cents a pound
Butter containing 35 per cent of water is worth only 23 cents a pound
Butter containing 38·1 per cent of water is worth only $21\frac{9}{10}$ cents a pound

Thirty-eight and one-tenth per cent of water was the highest test during the year. In purchasing 1 pound of such butter for 30 cents, the consumer is defrauded to the extent of $8\frac{1}{10}$ cents, and the person incorporating the excessive water has, to the same extent, an illegitimate profit.

INSPECTION OF WEIGHT OF PRINTS OR BLOCKS OF BUTTER.

The subsection of the Act dealing with the weight of prints or blocks of butter requires that they be "of the full net weight of one-quarter pound, one-half pound, one pound or two pounds at the time they are moulded or cut." This allows for a reasonable shrinkage, due to evaporation of water, which does not in any way defraud the consumer.

The work of inspecting the weight of prints or blocks of butter is done at the same time as the taking of samples for water determination.

The preliminary inspection of the weight of prints or blocks of butter is made on the scales of the vendor. In the event of the prints or blocks being short in weight to a greater extent than may be explained by evaporation of water, the manufacturer or cutter is for a first offence usually let off with a warning. In case a warning does not secure the desired results, and the brand of butter complained of continues to be short in weight, two or more prints are purchased, wrapped in paper, tied, and sealed. They are then taken to a public weigher or some other disinterested party, who breaks the seal, unwraps and weighs the blocks. If the second weighing confirms the results of the first weighing, a prosecution follows.

The responsibility for prints or blocks of butter being short in weight rests with the manufacturer or cutter thereof, and he alone profits thereby. As a consequence, most prosecutions on account of short weight blocks or prints have been against the manufacturer or cutter of the same.

A retail merchant, having in his possession for sale, blocks of butter which have been under weight at the time they were moulded or cut, is guilty of negligence in not inspecting the weights of the same, or in accepting them from a manufacturer, or from a wholesaler, knowing them to be short in weight. The sooner the retail dealers of the country appreciate their responsibility in this matter, the sooner will this form of fraud disappear. In this respect, retail dealers will be dealt with more strictly in the future than they have been in the past.

Proceedings have been taken against three cutters of prints or blocks of butter, and against one retail merchant on account of short weight, and fines, varying from $15 to $50, together with the costs of prosecution were imposed.

Prints or blocks of butter have been found to weigh as low as 12 ounces instead of 16 ounces, as required. If butter is selling at 30 cents a pound, a print weighing 15 ounces at time of cutting, if sold for 30 cents, costs the consumer at the rate of 32 cents per pound, while a 14 ounce print sold for 30 cents, costs the consumer $34\frac{2}{7}$ cents per pound.

THE BRANDING OF BUTTER AND CHEESE.

Creamery Butter.—The regulations do not require that creamery butter be branded as such, but they do require that it shall not be branded in any manner that shall give false information as to the creamery in which it was made. Several violations of this regulation have been observed during the year. In all cases except one, the offenders were let off with a warning. In this one case a prosecution was taken, a conviction secured, and a fine of $10, together with the cost of prosecutions, imposed.

Dairy Butter.—Dairy butter, as defined by the Act, is the product of less than fifty cows.

The regulations require that when dairy butter is packed in boxes similar to those used for the packing of creamery butter, the words "dairy butter" must be stencilled on the side of the box in letters not less than one-half inch long and three-eighths of an inch wide, and that when dairy butter is put up in the form of prints or blocks and wrapped in parchment paper the paper must be printed or branded with the words "dairy butter" in letters at least one-quarter inch square. It is not required that dairy butter in rolls, crocks, or tubs be branded.

The work of inspection of branding of dairy butter is carried on at the same time as that of inspecting for excessive water and short weights. Notwithstanding all the publicity given the regulations, it was found after September 1, 1914, that very little dairy butter was being properly branded. In October a circular (The Branding of Dairy Butter, No. 12, Dairy and Cold Storage Series) was prepared. Copies of this circular have since been supplied to every merchant called on who wished the same for distribution among his customers. In all, 25,000 copies of Bulletin No. 42, Dairy and Cold Storage Series, The Dairy Industry Act., 1914, and Regulations, and 100,000 copies of Circular No. 12 have been distributed during the year. The distribution of these circulars has been effective, and in some sections of the country practically all dairy butter is now properly branded. The number of inquiries received from all parts of the country for information regarding the branding of dairy butter indicates that the information has been widely spread. The makers of dairy butter are complying with the law as rapidly as could reasonably be expected, and before long practically all dairy butter should be properly branded.

Branding Dairy Butter as Creamery.—Twenty-three cases of farmers branding dairy butter as creamery have come under the observation of the different inspectors. In every case the offender has expressed ignorance of the law and has promised to comply with the regulations in future.

Whey Butter.—The regulations require that every package containing whey butter or a mixture of whey butter and dairy butter, or of whey butter and creamery butter, shall be branded at the time of packing with the words "whey butter". In the case of boxes or tubs, the lettering must be applied on the side of the package and must be at least one-half inch long and three-eighths of an inch wide. In the case of parchment paper wrappers and cartons, both of which must be branded, the lettering must be at least one-quarter inch square.

Early in the summer a copy of Bulletin No. 42 was sent to every cheese factory and creamery in Canada. One hundred and sixteen cheese factories were engaged in the manufacture of whey butter last year, all located in that part of Ontario lying east of Toronto. Eighty-two factories were visited, and the product of ten other factories was inspected in various stores. In several cases one man owned two or more factories which were engaged in the manufacture of whey butter. In such cases a visit to the owner served our purpose as well as

visiting each of his several factories. This will largely account for the fact that while 116 factories were making whey butter, only ninety-two inspections were made.

The results of the inspection were as follows:—

Twenty-two factories were branding properly.
Eight factories were branding as "creamery."
Two factories were branding as "choice butter."
The remainder were not branding in any way.

In every case where the branding was not carried out as required by the law, the manager of the factory was informed as to what was necessary, and he was warned that the regulations would be enforced. One manufacturer ignored the warning and continued branding his whey butter as "creamery." Two actions were taken against this man; one on account of using the word "creamery" on butter which was not creamery butter within the meaning of the Act; and the other on account of not branding whey butter as such. Two convictions were secured and a fine imposed in each case.

Skim-milk Cheese.—The regulations require that every cheese made wholly or in part from or by the use of skim-milk, shall be branded on the side of the cheese with the words "skim-milk cheese"; also every box or package containing such cheese shall be branded on the outside of the box or package with the words "Skim-milk cheese"; the lettering in both cases to be at least one-half inch long and three-eighths of an inch wide. These provisions are the same as in part viii of the Inspection and Sale Act, except that the size of the lettering has been reduced.

Three factories in Ontario were at times during the past year engaged in the manufacture of skim-milk cheese. These were each visited on one or more occasions, and a warehouse receiving cheese from two of the factories was also visited. At all times, such cheese and the boxes containing the same were found to be properly branded.

THE VERIFICATION OF GLASS WARE USED IN CONNECTION WITH MILK TESTS.

During the past year twenty creameries and city dairies were visited to ascertain if properly verified glassware was being used in connection with the Babcock milk test. In thirteen of these places the glassware was found to be all properly marked. In the remaining seven plants, all or part of the glassware had not been verified and marked. The managers of these places were supplied with copies of Circular No. 2, Dairy and Cold Storage Series, entitled "The Milk Test Act." Subsequently five of these seven places were again visited and it was found that all had in the meantime complied with the law.

This line of work will receive more attention in future from inspectors of dairy products.

PROSECUTIONS.

In all, forty-four offences have been prosecuted during the year. Convictions have been secured in all cases and, in all cases except one, fines have been imposed varying from $10 to $200, together with the costs of prosecution.

The following is a list of those who have been convicted:—

Name.	Address.	Offence.
Archambault, Sergius	Montreal, Que.	Selling butter containing over 16 per cent of water.
Bell & Sons, J. T.	Medicine Hat, Alta.	" "
Bergl & Kusch	Regina, Sask.	" "
Brandon Creamery & Supply Co.	Brandon, Man.	" "
" " "	"	" "
" " "	"	" "
Brandon Produce Co.	"	" "
"	"	" "
Braun, & Co., D. E.	Edmonton, Alta.	" "
Burnash, J. F.	Kingston, Ont.	Not branding whey butter as such.
"	"	Using word "Creamery" on whey butter.
Christie, A. R.	Winnipeg, Man.	Selling butter containing over 16 per cent of water.
Crescent Creamery Co.	Brandon, Man.	" "
Dorion, Emilien	Montreal, Que.	" "
"	"	Selling butter branded so as to give false information as to creamery in which it was made.
Edmonton City Dairy	Edmonton, Alta.	Selling butter containing over 16 per cent of water.
" "	"	" "
" "	"	Selling butter in prints which were not of the full net weight of one pound at the time they were cut.
Enterprise Dairy Co.	"	Selling butter containing over 16 per cent of water.
"	"	" "
Guaranteed Pure Butter Co.	Montreal, Que.	Selling butter in prints which were not of the full net weight of one pound at the time they were cut.
Latourelle, Leopold	"	Selling butter containing over 16 per cent of water.
"	"	" "
"	"	" "
"	"	" "
"	"	" "
"	"	Mixing water with butter.
Lazare, Armand	"	Selling butter containing over 16 per cent of water.
"	"	Selling butter in prints not of the full net weight of one pound at time they were cut.
Matheson & Urquhart	Vancouver, B.C.	Selling butter containing over 16 per cent of water.
"	"	" "
Mathie, G. A.	Brandon, Man.	" "
Melita Creamery	Melita, Man.	" "
Ouellette, E.	Montreal, Que.	" "
Parsons Haddock Co., Ltd.	Vancouver, B.C.	" "
Rees & Brigden	Brandon, Man.	" "
Richie, D. A.	Winnipeg, Man.	" "
Schnier, Abraham	Montreal, Que.	Selling butter in prints which were not of the full net weight of one pound at the time they were cut.
Smith & Burton	Brandon, Man.	Selling butter containing over 16 per cent of water.
"	"	" "
Tousignant, David	Montreal, Que.	" "
"	"	" "
Young, W. J.	Brandon, Man.	" "
"	"	" "

As the work goes on it would seem that prosecutions should become less numerous. The work of inspection of dairy products should prevent the necessity of prosecutions. It is in the best interests not only of the consumer, but also of the honest manufacturer and trader that conditions be kept such that numerous prosecutions will be unnecessary. This condition may be secured only by constant and efficient inspection.

J. F. SINGLETON,
Chief Inspector of Dairy Products.

OTTAWA, March 31, 1915.

APPENDIX X.

REPORT OF THE FRUIT COLD STORAGE AND TRANSPORTATION INVESTIGATIONS DIVISION.

The season of 1914 was one of organization as well as execution of policies for this division. When the writer received his appointment in charge of this division on May 1, 1914, the experimental fruit storage and pre-cooling plant at Grimsby was nearing completion; a large part of the equipment had been ordered and was being installed. At this time fruit prospects were such as to indicate only a very light crop, with relatively small quantity for shipment to the western provinces; peaches promised to be a total failure in yield, which prediction was verified as the season advanced. With these facts in view, the Grimsby plant was made ready to handle only about one-fourth of its total capacity, and to be used more as a commercial service for initiating the practice of pre-cooling in this district rather than for extensive commercial investigations. These arrangements were made previous to the first carload shipments of fruit, which came with the sour cherry season in July.

While the policy at the commercial end of the investigations was to thoroughly demonstrate the advantages of refrigeration in fruit transportation by making very low rates to the shippers in the vicinity, the short fruit crop gave the management a very good opportunity to inaugurate scientific investigations dealing with the leading varieties of fruit in the district held under different conditions of refrigeration.

The fruit marketing conditions in the Niagara Peninsula are somewhat different from those in any other fruit district in Canada. This is especially true when it comes to co-operating with the different marketing factors for the handling of long-distance experimental shipments of fruit. Some growers market their own fruit, shipping direct to the consumer, retailer or wholesale trade; others ship through fruit companies or semi-co-operative organizations (there are a few strictly co-operative organizations); while the larger percentage of growers depends upon the local fruit shipper to come along from day to day and bargain for the whole or a part of his crops in their season. There are from three to twelve local shippers at each shipping point. The larger part of their business is made up from small orders coming from retailers all over Eastern Canada to whom weekly quotations are sent by the various shippers, the shipments being made by express. If a shipper purchases more fruit than he has orders for, the balance is expressed to a wholesale house to be sold on commission. The larger part of the western shipments are handled by the local buyer, and are made partly by express to fill the small orders of the retailers and partly by refrigerated freight either on consignment or to meet f.o.b. sales to wholesale houses.

These marketing conditions are far from satisfactory, and result in chaotic conditions nearly every year. The nature of the competition of the local shippers is such as to hold back orders for lower prices at a time when retailers in Eastern Canada should be selling fruit. Western markets prefer to buy fruit from the United States, since by the system of marketing in the Niagara peninsula no assurance is to be had as to the merchantable condition of the purchase. With conditions such as these it makes it necessary for the department to purchase practically all of its fruit for experimental shipments, since with an

ungoverned system of marketing, such as exists in this district, the condition of the fruit making up commercial shipments is so variable as to vitiate any investigational records that might be undertaken.

To adapt the government pre-cooling plant to the marketing system in the Niagara district it was necessary to evolve a receiving system to accommodate both shippers and growers. It was necessary to deal with the shipper for the pre-cooling of carloads of fruit and at the same time it was necessary to receive the fruit direct from the orchards and the hands of the growers. Consequently the department accounted to both the grower and to the shipper for all fruit being pre-cooled, and charged direct to the shipper on all shipments made.

The initial experimental shipment made from Grimsby was in connection with Montmorency cherries in July. An abundance of Early Richmond and Montmorency cherries are grown in the Niagara district, and low prices rule in eastern markets. During the last season no shipper was prepared to ship a carload of pre-cooled cherries by refrigerated freight to western markets, consequently the department bought a carload consisting of 7,277 six-quart baskets of cherries and ten crates of raspberries, the cherries being purchased for 37½ cents per basket. On account of rains it required three days to assemble and pre-cool the fruit, and the refrigerator car furnished by the transportation company was of the brine-tank type which is the poorest for fruit shipments, so that the shipment was being made under the worst of conditions. The fruit was shipped on July 16, being consigned to the Scott Fruit Company, Winnipeg. The fruit arrived at its destination July 22 in perfect condition, and sold for 60 cents per basket in Winnipeg markets. Freight, icing, and commission charges amounted to $423.74.

The remarkable condition of this trial car of cherries led the wholesale firm to state that another year they could handle several cars of cherries, were they in as good a condition. The results from this single car of cherries show the large possibilities in developing western markets for Ontario tender fruits through suitable methods of handling and transportation.

The commercial use of the Grimsby plant was encouraged by making very low rates, which were as follows:—

	Cents.
For Pre-cooling—	
Eleven-quart baskets, forty-eight hours or less	1
Six-quart baskets, forty-eight hours or less	¾
Half-pear boxes, forty-eight hours or less	1¼
For Storage—	
Eleven-quart baskets, one month or less	2½
Six-quart baskets, one month or less	1½
Half-pear boxes, 1 month or less	2½
Apples in barrels, one month or less	15
Apples in barrels, winter season	45
Apples in boxes, one month or less	5
Apples in boxes, winter season	15
Minimum charge	25

The above rates were revised at the end of the season, and new rates will apply for the season of 1915.

The shippers of the vicinity took advantage of the low rates and during the season thirty-nine cars of pre-cooled fruit were handled. These consisted largely of plums, pears, and tomatoes. Not a single shipment of peaches was made. In addition to the pre-cooling the plant was used to a large extent by growers who wished to hold small lots of fruit a few days for a better market. Four and one-half cars of raspberries were held in storage for a short period. In the early apple season, 1,500 baskets were held to extend the market period. In the case of the pre-cooled fruits, two cars were made up wholly of pears for export which could not have been shipped on account of war conditions had not cold storage facilities been available. Some 2,348 boxes and 780 barrels of apples were held in storage for winter, as well as 17 tons of cabbage.

In every case where fruit was in proper shipping condition, the best of results followed and large profits realized, making the shippers enthusiastic over the advantages of having access to such facilities. The money which may be saved by fruit growers using refrigeration was well shown in the case of the raspberry crop, which is one of the less important crops of the district. By holding berries that were too ripe for market shipment for the use of jam factories, over $3,000 was saved in one week.

The experimental work for the season was confined chiefly to making observations as to the effect of different degrees of refrigeration upon the tender fruits of the Niagara district. Three different temperatures were used: 32°, 38° and 45° F. The following fruits and varieties were studied during the season: *Strawberries*, Williams; *Cherries*, Governor Wood, Early Richmond, Montmorency; *Gooseberries*, Columbus (European), Downing (American); *Black Currants*, Prince of Wales; *Red Currants*, Red Dutch; *Blackberries*, Lawton; *Blueberries*, Canada; *Raspberries*, Cuthbert; *Plums*, Washington Gage, Yellow Egg, Reine Claude, Bradshaw, Grand Duke; *Tomatoes*, Earliana, Chalk's Jewel, Danish Export; *Grapes*, Niagara, Concord, Agawam, Lindley, Wilder, Catawba, Vergennes.

In addition to these investigations, other lines of observations were being carried on to secure information regarding the rate of cooling of different fruits, and the effect of different rates of cooling. No attempt will be made to give any of the results of the above experiments in this report, since the experiments are not complete until supplemented by the results of future work.

The work of the past season has suggested a number of new lines of work, some of which will be attempted during the coming season. This is to include a more complete line of commercial transportation investigation with pre-cooling, careful handling and the development of improved packages.

The work performed during the first year reflects much credit upon the able assistance of Mr. George L. Fischer, scientific assistant for the season, upon the co-operation of the branch of the Fruit Commissioner, and upon the support given all projects by different officers of the branch.

EDWIN SMITH,

In charge Pre-cooling and Experimental Fruit Storage Warehouse.

GRIMSBY, ONT., March 31, 1915.

APPENDIX XI.

REPORT OF THE INSPECTOR OF WEIGHING OF BUTTER AND CHEESE.

I have the honour to submit my first annual report as inspector of weighing of butter and cheese, which covers the period from May 19, 1914, to March 31, 1915.

In presenting this report I shall make it as brief as possible, stating only the most prominent facts that come to my attention.

During the months under review I have weighed cheese and butter from or at 256 factories, and have tested the weights of 1,209 samples of cheese and 420 samples of butter. I have received verbally or in writing eighty-five requests with which I have been unable to comply, partly owing to my absence from the city, testing weights in the country, and partly because the goods in question had already been shipped from Montreal when such requests came to me. However, in all cases where the cheese or butter was in Montreal warehouse I have responded promptly by weighing such goods to the best of my ability.

I have replied to 174 letters, in most cases giving the test weights of butter and cheese which had been referred to. To Ottawa, forty-three reports were sent from time to time, covering the work done in different counties and districts, including Montreal.

I have visited over eighty factories, and in fifty-five of these the scales weighed incorrectly, were in faulty or defective condition, or improperly balanced or levelled. In one case I found a half-pound weight made of lead by the maker himself to replace a proper one that had been lost. This weight, when tested in Montreal, weighed 3 grams less than the correct weight. In some cases I found scales totally unfit for the weighing of butter and cheese.

In twenty-five of the factories visited the scales were found to be in good working condition, and in several cases, although the cheese was not properly weighed it was due more to the neglect of the maker or person appointed to do the weighing in not giving sufficient allowance of half a pound up and above the balance of the beam to ensure good weights.

I was called 128 times to warehouses in Montreal, either by salesmen or merchants, to test the weights of butter or cheese, and in all cases I have answered promptly when in the city or, if out of town, I have attended to these requests at once upon my return.

As soon as a demand or complaint came to my knowledge from either an exporter, salesman, maker, or proprietor, I immediately took my scale to the warehouse where the goods were, and after testing the weights, if the discrepancies were 2, 3, 4, or 5 pounds different from the weights marked on the box or the actual weights of the cheese or butter, I then proceeded to the factory as soon as possible, so as to trace the cause of such difference, to remedy same if possible, and to put the maker on a proper footing to weigh correctly.

In places where the cheese were still on the shelves, I had the maker place his scale in the actual position that he was in the habit of using when doing the weighing. Then we weighed the cheese on his scale and reweighed them on my

beam. In all cases the weights retested on my beam, were marked and stencilled on the cheese, and stamped with a special stamp on both cheese and boxes for identification in Montreal. In the case of butter, the boxes alone were stamped and marked.

When these marked packages of cheese or butter reached Montreal I again weighed all of them that I could find, so as to discover the shrinkage in weight from the time they were weighed in the factory and the time of reweighing in Montreal.

It was by this method that I have been able to establish the fact that cheese made on the 24th of May, weighed at the factory on the first of June, and reweighed in Montreal ten days afterwards, showed the following shrinkage of from one-quarter of a pound to one pound:—

	lb.	oz.		lb.	oz.		oz.
June 1	81	14	Reweighed on June 10	81	8	Loss	6
" 1	78	14	" "	78	8	"	6
" 1	77	8	" "	77	4	"	4
" 1	78	12	" "	78	8	"	4
" 1	80	—	" "	79	8	"	16

In another instance, cheese weighed at factory fourteen days previous to the 17th of July showed the following losses:—

	lb.	oz.		lb.	oz.	lb.	oz.
						Loss.	
July 3.	82	12	Reweighed in Montreal, July 17	81	8	1	4
" 3.	84	4	" " "	83	—	1	4
" 3.	82	—	" " "	81	8	1	8
" 3.	83	12	" " "	82	8	1	4
" 3.	83	4	" " "	81	12	1	8

Another example of five cheese weighed and reweighed at an interval of five days only, shows a shrinkage, while less than the previous lot, yet very noticeable however, when one bears in mind that these cheese were very well cured:—

	lb.	oz.		lb.	oz.		
July 6	74	4	Reweighed, July 11	74	0	Shrinkage	4 oz.
" 6	76	8	" "	76	8	"	O.K.
" 6	77	4	" "	77	—	"	4 oz.
" 6	76	—	" "	72	12	"	4 oz.
" 6	77	8	" "	77	8	"	O.K.

In the above factory I found a very good scale, well balanced and levelled; also neatly kept. The maker weighed honestly, and after he was aware of the rule of half a pound up beam allowance I heard no more complaints against his factory.

SESSIONAL PAPER No. 15a

Another example of five cheese made June 8, weighed at factory June 15, and reweighed in Montreal June 27, showed the following results:—

	lb.	oz.		lb.	oz.		lb.	oz.
June 15.	88	—	Reweighed June 27	86	15	Shrinkage	1	1
" 15.	86	4	" "	85	2	"	1	2
" 15.	88	2	" "	87	—	"	1	2
" 15.	84	8	" "	82	15	"	—	9
" 15.	87	—	" "	86	—	"	1	—

The maker, who at the same time was the owner of the factory, told me that for the past twelve years he has been the proprietor of this factory, and no person ever came around to inspect his scale. Even the outside of this scale looked neat and clean enough, but the inside and parts underneath were very dirty and rusty, and it took a half pound weight to move the beam properly. I could refer to dozens of scales of the same character, but will proceed on to other points; for instance, showing an example of five cheese weighed on a cheese factory scale and reweighed immediately afterwards on my beam showing a difference of one-half to one pound for each cheese, which shows clearly the irregularity and defects of such scales.

Cheese Factory Scale.			My Own Beam.			Pounds.
lb.	oz.		lb.	oz.		
88	4	Reweighed	87	4	Loss	1
87	4	"	86	4	"	1
82	—	"	81	4	"	1
81	6	"	81	—	"	½
82	—	"	81	8	"	¼

Below follows an example of cheese weighed a long distance from Montreal (Chicoutimi district), loaded in a box car, in transit for a full week, and reweighed in Montreal eight days afterwards, showing the necessity of giving cheese that have to stand such conditions not less than ¾ to 1 pound allowance, if O.K. weights are desired to be obtained at Montreal.

Weighed at Shipping Point.			Reweighed in Montreal Eight Days Afterwards			
Marked Weight.	Actual Weight.		lb.	oz.		oz.
lb.	lb.	oz.				
79	80	—	79	12	Shrinkage	4
81	82	—	81	8	"	8
84	84	12	84	4	"	8
81	82	—	81	8	"	8
83	84	—	83	12	"	4

Another sample showed practically the same result:—

lb.		lb.	oz.	lb.	oz.		oz.
75		75	—	74	8	Shrinkage	8
80		78	12	78	4	"	8
68		68	12	68	4	"	8
85		85	8	85	—	"	8
67		68	—	67	8	"	8

It must, however, be remembered that the above cheese were shipped in close-tight box cars during very hot weather.

The conclusion arrived at from tests, such as the above, is that when cheese are a week or so in transit, the normal shrinkage will be not less than three-quarters to one pound by the time they reach Montreal.

The following is another example of cheese shipped from only a short distance out of Montreal, well cured, and weighed in St. Jovite on the 15th of the month, three days before shipment, and reweighed here on the 22nd of the month:—

lb.	oz.			lb.	oz.	Result.
81	4	Reweighed at Montreal		81	4	O. K.
82	—	"	"	82	—	O. K.
81	12	"	"	81	8	Shrinkage 4 oz.
80	—	"	"	80	—	O. K.
80	4	"	"	80	4	O. K.

Shrinkage in one week only one-quarter of a pound. This, I think, was very satisfactory.

REWEIGHING OF BUTTER.

One example of butter weighed at the shipping point shows how short weights occur in some cases:—

Gross. lb.	oz.	Tare. lb.	oz.	Net Weight lb.	oz.		lb.	oz.
63	8	7	8	56	—	Straight beam is	55	1
62	12	7	4	55	8	" "	55	1
66	12	7	4	55	8	" "	55	1
63	4	7	5	55	15	" "	55	1
63	—	7	—	56	—	" "	55	1

According to the rules and custom of the trade, these five boxes had lost one pound each before leaving shipping point.

GREEN CHEESE.

With reference to green cheese, I would say that during my travelling in the country I have been to certain factories where only three cheese were left on the shelves, and others where no cheese could be found in the factory, except what was in the presses.

The reason the makers gave me for this was, that as the neighbouring factories were shipping green, they were compelled to do the same in order to keep up with them.

The conclusions to be drawn from the work accomplished during the season are that the losses and shrinkages are particularly due to the same causes as mentioned in the report of the Royal Commission, viz:—

1. Use of cheap inferior scales at factories, giving false weights.
2. Carelessness in weighing and marking, and ignorance in the use of scales.
3. The shipping of green cheese, in which there is excessive shrinkage.

In closing this, my first report, I desire to state that at all times when copies of certificates were requested from the public weigher (Mr. John McLeod) he always showed himself ready to supply me with same. In cases where I had occasion to weigh the same cheese as Mr McLeod had weighed I never found any errors in his figures.

J. E. D. GAREAU,

Inspector of Weighing of Butter and Cheese.

MONTREAL, QUE., March 31, 1915.

APPENDIX XII.

SOME STATISTICS OF THE EXPORT AND IMPORT TRADE IN DAIRY PRODUCE.

TOTAL EXPORTS OF CHEESE AND BUTTER in Fiscal Years 1880 to 1915, inclusive.

Butter.			Cheese.		
Year.	Quantity.	Value.	Year.	Quantity.	Value.
Year ended June 30.	Lb.	$	*Year ended June 30.*	Lb.	$
1880	15,535,362	3,058,069	1880	40,368,678	3,893,366
1890	1,951,585	340,131	1890	94,260,187	9,372,212
1891	3,768,101	602,175	1891	106,202,140	9,508,800
1892	5,736,[illegible]	1,056,058	1892	118,270,052	11,652,412
1893	7,036,013	1,296,814	1893	133,946,365	13,407,470
1894	5,534,621	1,095,588	1894	154,977,480	15,488,191
1895	3,650,258	697,476	1895	146,004,650	14,253,002
1896	5,889,241	1,052,089	1896	164,689,123	13,956,571
1897	11,453,351	2,089,173	1897	164,220,699	14,676,239
1898	11,253,787	2,046,686	1898	196,703,323	17,572,763
1899	20,139,195	3,700,873	1899	189,827,839	16,776,765
1900	25,259,737	5,122,156	1900	185,984,430	19,856,324
1901	16,335,528	3,295,663	1901	195,926,397	20,696,951
1902	27,855,978	5,660,541	1902	200,946,401	19,986,281
1903	34,128,944	6,954,618	1903	229,099,925	24,712,943
1904	24,568,001	4,724,155	1904	233,980,716	24,184,566
1905	31,754,303	5,930,379	1905	215,733,259	20,300,500
1906	34,031,525	7,075,539	1906	215,834,543	24,433,169
Year ended Mar. 31.			*Year ended Mar. 31.*		
1907 (9 months)	18,078,508	4,011,609	1907 (9 months)	178,141,567	22,006,584
1908	4,786,954	1,068,703	1908	180,710,463	22,887,237
1909	1,326,355	1,521,436	1909	164,907,139	20,384,666
1910	4,615,380	1,010,274	1910	180,8[illegible]886	21,607,692
1911	3,142,682	744,288	1911	181,895,724	20,739,507
1912	8,844,402	2,077,916	1912	163,450,634	20,888,818
1913	828,323	223,578	1913	155,216,392	20,697,144
1914	1,228,753	309,046	1914	144,478,340	18,868,785
1915	2,724,913	639,625	1915	137,601,661	19,213,501

DETAILED EXPORTS OF DAIRY PRODUCTS for year ended March 31, 1915.

To all countries.		Quantity.	Value.
			$
Cheese	Lb.	137,601,661	19,213,501
Butter	"	2,724,913	639,625
Cream	Gal.	1,895,575	1,836,006
Condensed milk	Lb.	18,355,975	1,181,300
Casein	"	230,045	13,923
Fresh milk	Gal.	477,692	68,205
Total value			22,952,560

COMPARATIVE VALUE OF DETAILED EXPORTS for Years ended March 31, 1910, 1911, 1912, 1913, 1914 and 1915.

	1915.	1914.	1913.	1912.	1911.	1910.
	$	$	$	$	$	$
Cheese	19,213,501	18,868,785	20,697,144	20,888,818	20,739,507	21,607,692
Butter	639,625	309,046	223,578	2,077,916	744,288	1,010,272
Condensed milk	1,181,300	666,941	25,594	305,678	469,406	541,373
Fresh milk	68,205	47,645	1,412	975	4,276	
Cream	1,836,006	1,289,680	751,123	792,595	1,714,528	
Casein	13,923	11,071	15,342	38,302	37,009	
	22,952,560	21,193,168	21,714,153	24,104,376	23,709,014	23,159,336

EXPORTS TO UNITED STATES—Values of Dairy Products Exported to the United States during the Years ended March 31, 1909, 1910, 1911, 1912, 1913, 1914 and 1915.

	1915.	1914.	1913.	1912.	1911.	1910.	1909.
	$	$	$	$	$	$	$
Cheese	39,461	187,335	41,366	31,653	36,034	23,995	10,428
Butter	263,541	111,894	75,192	103,819	91,313	199,854	18,248
Cream	1,836,006	1,289,655	751,123	792,595	1,714,525	220,446	8,256
Condensed milk	945,189	301,177	5,107	3,983	11,474		
Casein	13,923	11,071	15,342	38,302	37,009		
Fresh milk	68,205	47,645	1,412	975	3,257		
	3,171,325	1,948,777	889,542	971,327	1,893,615	445,295	45,930

Down to the beginning of the fiscal year 1911, the exports of fresh milk, cream, condensed milk and casein were included under one head in the Trade and Navigation returns.

STATEMENT OF EXPORTS OF BUTTER by Countries in Fiscal Years, 1905 to 1915 inclusive, (Years ended June 30, 1905 to 1906; Years ended March 31, 1907 to 1915).

To	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
	$	$	$	$	$	$	$	$	$	$	$
Great Britain	5,568,939	6,802,003	3,805,925	822,761	1,273,484	587,493	401,621	1,769,510	173	31,950	150,612
British West Indies	80,323	87,085	59,313	85,371	95,370	76,026	70,444	54,365	26,694	27,970	41,710
British Guiana	8,929	11,654	8,113	12,861	7,711	9,497	10,682	4,865	1,772	5,578	3,861
Other British Possessions				5		544	1,423	86	188	560	956
Newfoundland	82,287	48,283	56,516	34,931	54,552	50,074	57,198	76,691	62,945	79,669	121,548
China	562	761	5,041	1,319							
Cuba	658	285	1,034	720	96	22	985	158	223	69	194
Danish West Indies	4,475	4,560	3,664	4,939	4,418	4,697	1,438	2,455	1,158	1,456	1,719
Germany						9,777					
Japan	6,496	9,373	9,062	4,258	3,019	1,002	849	240			20
St. Pierre and Miquelon	21,827	17,668	17,615	18,749	11,740	14,036	18,560	8,216	12,561	13,497	17,368
United States	70,580	33,965	3,539	38,899	18,246	199,854	91,313	105,819	75,192	111,894	268,541
British Africa	4,914	2,056	265		22,458	1,873	10,460	2,596			
Mexico		1,268	484	267	660	936	59	171	31		840
U. S. Colombia	200	1,747	2,145		1,105	832		69		3,860	2,232
Bermuda	50,482	47,045	33,906	33,177	14,273	43,638	54,665	41,209	33,677	25,606	24,568
France	14,440	4,155									
Holland	13,680										
Belgium	116									10	126
Central America	1,062	3,431	4,932	9,448	7,074	2,500	3,948	3,268	2,890	3,212	921
Korea	15					15					
Dutch Guiana	186	30	40			48					
Turkey	50		21								
Porto Rico		170									
Panama					4,229	7,320	19,881	10,000	5,420	3,715	4,888
Austria-Hungary					1						
Alaska							771	498	746		21
Totals	5,930,379	7,075,539	4,011,699	1,068,703	1,521,436	1,010,274	744,288	2,077,916	223,578	309,046	639,625

STATEMENT OF EXPORTS OF CHEESE by Countries in Fiscal Years 1905 to 1915 inclusive (Years ended June 30, 1905 to 1906; Years ended March 31, 1907 to 1915).

To	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
	$	$	$	$	$	$	$	$	$	$	$
Great Britain	20,174,211	24,300,908	21,909,878	22,763,736	20,268,166	21,481,560	20,577,54[illegible]	20,733,06[illegible]	20,497,195	18,533,880	18,936,704
Australia	5,411	5,350	245	525	[illegible]23	171	[illegible]8	[illegible]8	448	769	213
British Africa	10,612	16,623	18,261	16,362	12,466	16,425	22,691	26,873	28,100	26,128	73,009
B. W. Indies	36,176	25,509	13,666	27,353	26,940	24,0[illegible]	25,8[illegible]	26,25[illegible]	24,164	25,900	21,283
B. E. Indies	62	20	.....	.....	.....	.....	.....	.....	.....	.....	.....
British Guiana	2,571	3,860	3,143	6,2[illegible]	4,452	5,2[illegible]	4,717	7,872	6,975	8,581	14,765
Other British Possessions	.....	.....	.....	9	1	1,011	1,575	.....	24	1,145	3,050
Hong Kong	1,079	1,029	.....	851	2,452	7[illegible]	1,077	1,497	3,335	1,912	2,830
New Zealand	1,642	1,795	1,690	1,362	54	1,267	467	645	385	449	.....
Newfoundland	35,171	30,992	37,748	35,792	41,163	36,912	39,85[illegible]	44,435	63,900	50,414	68,522
Belgium	22	287	.....	2,080	.....	.....	1	.....	.....	.....	15,000
Cuba	102	811	.....	57	.....	17	4[illegible]	52	852	324	73
China	2,013	2,195	2,206	1,572	568	756	1,040	1,3[illegible]	1,505	987	1,569
Danish West Indies	2,046	2,056	1,568	1,985	1,937	2,453	2,44[illegible]	2,704	2,416	4,666	4,009
France	700	7,203	.....	10	81	.....	[illegible]5[illegible]	[illegible]8	2,351	.....	.....
Japan	759	775	1,071	1,444	2,200	1,20[illegible]	2,76[illegible]	1,419	2,392	3,697	2,007
St. Pierre and Miquelon	341	875	[illegible]18	[illegible]96	364	[illegible]1[illegible]	[illegible]2[illegible]	274	[illegible]96	295	682
United States	14,182	16,082	6,900	17,732	19,428	23,995	36,03[illegible]	31,67[illegible]	41,[illegible]66	187,335	39,461
Norway and Sweden	104	994	.....	.....	.....	[illegible]	.....	.....	.....	.....	.....
Germany	364	.....	54	3	.....	102	.....	.....	.....	.....	.....
Bermuda	12,505	14,033	9,080	9,245	3,174	11,[illegible]85	1,126	10,494	20,738	20,397	26,478
Dutch Guiana	18	13	9	.....	.....	.....	.....	.....	.....	.....	.....
Mexico	329	1,594	630	168	499	10[illegible]	7[illegible]	[illegible]6	26	.....	.....
French West Indies	.....	.....	.....	.....	.....	.....	.....	.....	55	.....	.....
Central America	80	.....	.....	347	[illegible]	.....	112	.....	.....	6	.....
Holland	.....	97	110	.....	.....	.....	.....	.....	.....	.....	.....
U. S. of Colombia	.....	68	.....	.....	.....	.....	.....	.....	23	570	.....
Other countries	.....	.....	.....	6	.....	[illegible]	14[illegible]	[illegible]12	724	1,570	3,846
Totals	20,300,500	24,433,169	22,006,584	22,887,237	20,384,666	21,607,6[illegible]	20,739,[illegible]07	20,988,81[illegible]	20,697,144	18,838,785	19,213,501

CHEESE IMPORTS INTO THE UNITED KINGDOM, from British Trade Returns, Years ended December 31.

From	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Canada	1,698,847	1,541,502	1,566,546	1,607,064	1,473,275	1,352,570	1,293,768	1,167,778
United States	114,300	105,555	54,617	38,247	150,321	21,227	22,449	31,393
Netherlands	241,551	279,401	285,329	231,832	207,917	268,286	292,134	339,124
New Zealand	192,301	264,995	368,531	453,785	397,845	543,917	547,182	742,419
Other countries	125,234	114,633	115,067	125,427	118,964	122,787	142,046	143,161
Total	2,372,233	2,305,086	2,390,090	2,456,340	2,348,326	2,308,787	2,297,579	2,423,872
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Canada	71·7	66·8	65·5	65·5	62·7	58·6	56·3	48·2
United States	4·8	4·6	2·3	1·6	6·4	0·9	1·0	1·3
Netherlands	10·2	12·1	11·9	9·4	8·9	11·6	12·7	13·9
New Zealand	8·1	11·5	15·4	18·5	16·9	23·6	23·8	30·7
Other countries	5·2	5·0	4·8	5·0	5·1	5·3	6·2	5·9
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

BUTTER IMPORTS INTO THE UNITED KINGDOM from British Trade Returns, Years ended December 31.

From	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Russia	657,549	639,118	601,712	584,040	638,284	683,650	751,414	616,389
Sweden	226,740	238,929	312,142	345,684	360,357	335,614	332,331	270,138
Denmark	1,818,811	1,857,103	1,764,027	1,726,091	1,707,178	1,618,048	1,706,759	1,749,072
Germany	7,297	3,195	2,965	3,481				
Netherlands	248,408	244,356	148,567	154,537	104,655	113,716	153,172	183,996
France	281,306	394,612	413,306	361,249	171,030	246,652	248,579	273,819
United States	1,063	39,540	693	756	23,052	2,596	164	7,844
Australia	598,986	409,106	384,619	539,054	874,399	541,273	588,399	433,802
New Zealand	313,863	221,395	278,581	362,674	276,446	349,012	251,663	357,939
Canada	34,753	47,877	22,522	15,805	61,936	27	813	3,151
Other countries	101,192	115,590	133,699	131,129	85,305	115,191	105,728	87,798
Total	4,210,156	4,210,821	4,062,833	4,325,539	4,302,692	4,005,159	4,139,022	3,983,921
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Russia	15·6	15·2	14·8	13·5	14·8	17·1	18·2	15·5
Sweden	5·4	5·7	7·7	7·9	8·4	8·4	8·0	6·8
Denmark	43·2	44·1	43·4	39·9	39·7	40·4	41·2	44·1
Germany	0·2	0·1	0·07	0·09				
Netherlands	4·0	5·8	3·7	3·9	2·4	2·8	3·7	4·6
France	6·7	9·7	10·1	8·4	4·0	6·1	6·0	6·9
United States	0·03	0·9	0·01	0·01	0·5	0·0	0·0	0·2
Australia	14·2	9·5	9·5	14·7	20·3	13·6	14·2	10·8
New Zealand	7·5	5·3	6·9	8·3	6·4	8·7	6·1	8·9
Canada	0·8	1·1	0·6	0·3	1·4	0·0	0·0	0·1
Other countries	2·4	2·6	3·3	3·0	2·1	2·9	2·6	2·2
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

N.B.—1914 figures unrevised.

IMPORTS OF DAIRY PRODUCE, for Consumption in Canada, during the Years ended March 31.

———	1910.	1911.	1912.	1913.	1914.	1915.
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Cheese	683,778	866,653	919,189	1,495,758	1,512,108	1,162,465
Butter	393,582	1,227,390	3,874,587	7,989,269	7,317,259	6,822,540
Condensed milk	256,124	173,309	133,365	261,555	453,417	120,845

IMPORTS OF BUTTER BY COUNTRIES during the Years ended March 31

Country.	QUANTITIES.					
	1910.	1911.	1912.	1913.	1914.	1915.
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Great Britain	6,161	29,252	766,909	767,131	91,900	66,259
Australia	299,440	438,870	101,640	98,112	227,602	226,856
New Zealand	21,840	464,951	2,139,944	6,018,022	6,732,155	6,390,580
Turkey	240	167	165		1,882	
United States	61,081	293,937	929,318	1,100,431	262,840	1,534,332
Other countries	4,820	213	2,620	5,573	880	1,573
Totals	393,582	1,227,390	3,874,587	7,989,269	7,317,259	6,822,540

DEPARTMENT OF AGRICULTURE

CANADA

REPORT

OF THE

VETERINARY DIRECTOR GENERAL

(F. TORRANCE, B.A., D.V.S.)

FOR THE

Year Ending March 31, 1915

PRINTED BY ORDER OF PARLIAMENT.

OTTAWA
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1916.

[No. 15b—1916.]

REPORT

OF THE

VETERINARY DIRECTOR GENERAL

HEALTH OF ANIMALS BRANCH,
OTTAWA, March 31, 1915.

SIR,—I have the honour to present my report as Veterinary Director General for the year ending March 31, 1915.

The past year has been marked by the occurrence in the United States of the most severe outbreak of foot-and-mouth disease in the history of that country. Situated as we are, with four thousand miles of continuous boundary, and with a vast interchange of commodities, including animals and their products, the presence within their borders of such a highly communicable disease as foot-and-mouth disease could only be viewed with alarm. Prompt measures were adopted to exclude all dangerous carriers of infection and to surround the traffic in other less dangerous commodities with all the safeguards that prudence could suggest. It is gratifying to report that at this date no case of the disease has been found in Canada, and that the danger of the spread of infection is lessening from day to day. In order to cope with the extra work entailed in carrying out the regulations, and to guard our boundary against this disease, it has been necessary to add to our staff a number of men for this special duty. These can be dispensed with when the danger is over.

The present war has had its effect upon the work of the branch. Many of our veterinary inspectors have felt it their duty to obey the call to arms, and are now on active service. This has caused the branch to be short-handed, and although several appointments have been made from time to time, it has often been difficult to carry on the work, and would have been well-nigh impossible had not every member of the staff been willing to do even more than his duty.

Notwithstanding these difficulties, the work of the branch has been performed efficiently. Progress is reported in every line, as will be seen in the following detailed statement of the diseases dealt with:—

GLANDERS.

A further reduction is to be noted in regard to this disease. Four provinces have been entirely free from it during the period covered by the statistics. The great majority of the cases have occurred in the provinces of Saskatchewan and Alberta, which have also obtained by far the larger portion of the immigration to Canada. The influx of new settlers attracts the horse-dealer to supply the necessary horses for

tilling the soil. These horses are often brought long distances by train, and exposed to the most favourable conditions in car and stable for the spread of infection should it happen to be present. The dispersal of these horses among buyers from various localities may disseminate the infection very widely, and if, as is often the case, the newcomer, through ignorance of our laws, fails to notify our officers of the existence of disease, it may become widely spread before reaching our notice. These appear to be the chief reasons for the difficulty of suppressing glanders in these prairie provinces, and we might add, the immense area to be covered by a limited number of inspectors.

DOMINION.

1 killed on inspection.
285 killed at first test.
46 " second test.
6 " third test.

338 (valued at $53,335, at a cost of $35,556.65.)

100 showed clinical symptoms.

8,781 horses were tested with mallein, of which 337 reacted and were destroyed. Of the 337 reactors, 99 showed clinical symptoms of glanders at or during the test.

110 horses are under control for retest.

Of the above 338 horses slaughtered, 5 were killed without compensation as being diseased when imported into Canada.

PRINCE EDWARD ISLAND.

1 horse was tested and proved to be healthy.

NOVA SCOTIA.

136 horses were tested and proved to be healthy.

NEW BRUNSWICK.

97 horses were tested and proved to be healthy.

QUEBEC.

14 killed at first test.
3 " second test.

17 (valued at $2,870 at a cost of $1,913.33.)

11 showed clinical symptoms.

448 horses were tested with mallein, of which 17 reacted and were destroyed. Of the 17 reactors 11 showed clinical symptoms of glanders at or during the test.

No horses are under control for retest.

Of the 17 horses slaughtered—

2 were in the electoral district of Beauce.
1 was " " " Chicoutimi and Saguenay.
1 " " " " Laval.
12 were " " " St. Hyacinthe.
1 was " " " Temiscouta.

ONTARIO.

847 horses were tested and proved to be healthy.

MANITOBA.

38 killed at first test.
7 " second test.

45 (valued at $7,970 at a cost of $5,313.33.)

13 showed clinical symptoms.

1,294 horses were tested with mallein, of which 45 reacted and were destroyed. Of the 45 reactors 13 showed clinical symptoms of glanders at or during the test.

8 horses are under control for retest.

Of the 45 horses slaughtered—

24 were in the electoral district of Brandon.
18 " " " " Dauphin.
1 was " " " " Lisgar.
2 were " " " " Winnipeg.

SASKATCHEWAN.

155 killed at first test.
28 " second test.
3 " third test.

186 (valued at $28,530 at a cost of $19,020.)

52 showed clinical symptoms.

3,845 horses were tested with mallein, of which 186 reacted and were destroyed. Of the 186 reactors 52 showed clinical symptoms of glanders at or during the test.

27 horses are under control for retest.

Of the 186 horses slaughtered—

10 were in the electoral district of Assiniboia.
10 " " " " Battleford.
34 " " " " Humboldt.
10 " " " " Mackenzie.
43 " " " " Moosejaw
1 was " " " " Prince Albert.
12 were " " " " Qu'Appelle.
45 " " " " Regina.
21 " " " " Saskatoon.

186

ALBERTA.

1 killed on inspection.
63 killed at first test.
5 " second test
3 " third test.

72 (valued at $11,615 at a cost of $7,743.33.)

18 showed clinical symptoms.

1,603 horses were tested with mallein, of which 71 reacted and were destroyed. Of the 71 reactors 17 showed clinical symptoms of glanders at or during the test.

68 horses are under control for retest.

Of the 72 horses slaughtered—

44 were in the electoral district of Calgary.
25 " " " " Medicine Hat.
3 " " " " Red Deer.

72

BRITISH COLUMBIA.

15 killed at first test.
3 " second test.

18 (valued at $2,350 at a cost of $1,566.66.)

6 showed clinical symptoms.

510 horses were tested with mallein, of which 18 reacted and were destroyed. Of the 18 reactors, 6 showed clinical symptoms of glanders at or during the test.

7 horses are under control for retest.

All of the 18 horses slaughtered were in the electoral district of New Westminster.

HOG CHOLERA.

This disease continues to give us much trouble and anxiety and to cause serious losses in the districts where it appears. Prompt notification of the existence of the disease is essential to successful control work, and this is difficult to obtain. Farmers are apt to put off notifying our officers until they have lost several hogs, and by this time the disease has usually invaded neighbouring herds, making its eradication difficult and expensive. In my opinion, a great reason for the delay in notification of the disease lies in the fact that the compensation allowed for hogs slaughtered under the Animal Contagious Diseases Act is low compared with the actual value of hogs at the present time. Ten dollars is the maximum compensation paid for a grade hog, and as the owner usually has sows worth very much more than that, he takes a chance that the disease is not hog cholera and puts off notifying our officer for several days, during which the infection spreads to adjoining premises.

The practice of feeding garbage is responsible for many outbreaks, and as the persons engaged in this business are often foreigners, sometimes Chinamen, it is difficult to get them to notify us of the existence of disease. Steps should be taken to place garbage feeding under such restrictions that some control could be maintained.

Dominion.—In the Dominion, 34,779 hogs, valued at $295,471.93 were destroyed as diseased, at a cost of $196,981.28 in compensation.

Nova Scotia.—In Nova Scotia, one owner's premises were quarantined on account of suspected hog cholera, involving the control of 513 hogs.

New Brunswick.—Two outbreaks of hog cholera occurred in New Brunswick in which 33 hogs, valued at $117, were destroyed in the electoral district of Westmorland, at a cost of $278 in compensation.

One owner's premises were also quarantined on suspicion, involving the control of 200 hogs.

One hog, valued at $15, was destroyed for purposes of examination, but no evidence of hog cholera was found.

Quebec.—Nine outbreaks of hog cholera occurred in Quebec in which 1,291 hogs, valued at $14,063.50, were destroyed in the undermentioned districts at a cost of $9,375.66 in compensation.

Seventeen premises were also quarantined on suspicion, involving the control of 876 hogs.

One hog, valued at $15, was destroyed for purposes of examination, but no evidence of hog cholera was found.

District.	No. of Outbreaks.	Hogs Destroyed.
Chicoutimi and Saguenay	1	332
Jacques Cartier	1	50
Laval	1	32
Montmorency	1	380
Quebec	2	401
St. Johns and Iberville	1	3
Terrebonne	1	85
Wright	1	8
	9	1,291

Ontario.—Five hundred and thirty-seven outbreaks of hog cholera occurred in Ontario, in which 16,330 hogs, valued at $135,477.33 were destroyed in the undermentioned districts at a cost of $90,318.22 in compensation.

Two hundred and eighty-six premises were also quarantined on suspicion, involving the control of 8,761 hogs.

Four hogs, valued at $38, were destroyed for purposes of examination, but no evidence of hog cholera was found.

District.	No. of Outbreaks.	Hogs Destroyed.
Carleton	2	187
Essex, N.R	6	142
Essex, S.R	222	7,372
Frontenac	14	608
Kent, E.R	22	582
Kent, W.R	177	5,651
London	1	7
Middlesex, E.R	2	53
Ontario, S.R	1	11
Oxford, S.R	21	420
Peel	1	22
Russell	17	426
Thunder Bay and Rainy River	35	290
Welland	2	47
Wentworth	5	303
York, C.R	9	209
	537	16,330

Manitoba.—Twenty-six outbreaks of hog cholera occurred in Manitoba in which 844 hogs, valued at $8,652, were destroyed in the undermentioned districts at a cost of $5,768 in compensation.

Twenty-one premises were also quarantined on suspicion, involving the control of 308 hogs.

One hog was destroyed without compensation for purposes of examination, but no evidence of hog cholera was found.

District.	No. of Outbreaks.	Hogs Destroyed.
Dauphin	1	19
Lisgar	2	30
Macdonald	1	166
Portage-la-Prairie	1	20
Provencher	9	113
Selkirk	4	82
Souris	3	74
Winnipeg	5	400
	26	844

Saskatchewan.—One hundred and eighty outbreaks of hog cholera occurred in Saskatchewan in which 4,349 hogs, valued at $37,722.30 were destroyed in the undermentioned districts at a cost of $25,148.20 in compensation.

One hundred and four premises were also quarantined on suspicion, involving the control of 2,950 hogs.

Fifty hogs, valued at $319.60, were destroyed for purposes of examination, but no evidence of hog cholera was found.

District.	No. of Outbreaks.	No. Destroyed.
Assiniboia	78	1,713
Battleford	1	62
Humboldt	2	8
Moose Jaw	16	278
Regina	58	1,454
Saskatoon	25	834
	180	4,349

Alberta.—One hundred and fifty-six outbreaks of hog cholera occurred in Alberta in which 9,427 hogs, valued at $77,743.20 were slaughtered in the undermentioned districts at a cost of $51,828.80 in compensation.

One hundred and forty-four premises were also quarantined on suspicion, involving the control of 6,126 hogs.

Twenty-three hogs, valued at $122.25, were destroyed for purposes of examination, but no evidence of hog cholera was found.

District.	No. of Outbreaks.	No. Destroyed.
Calgary	64	3,859
Edmonton	16	1,000
Macleod	5	169
Medicine Hat	45	3,219
Red Deer	12	547
Strathcona	5	326
Victoria	9	307
	156	9,427

British Columbia.—Seventy-eight outbreaks of hog cholera occurred in British Columbia in which 2,505 hogs, valued at $21,396.60, were slaughtered in the undermentioned districts at a cost of $14,264.40 in compensation.

Thirty-four premises were also quarantined on suspicion, involving the control of 1,062 hogs.

District.	No. of Outbreaks.	Hogs Destroyed.
Comox-Atlin	7	56
Kootenay	12	381
Nanaimo	9	164
New Westminster	12	892
Vancouver	1	53
Victoria	8	142
Yale-Cariboo	29	817
	78	2,505

DOURINE.

The very serious outbreak of dourine reported last year has occupied the attention of our staff in southern Alberta during the period covered by these figures and still continues to receive unceasing care. Every effort is made to limit its extent and to destroy every source of infection. It will be noted from the following statistics that progress has been made, and the situation is much more favourable than it was a year ago.

A total of 394 animals, valued at $48,931, were slaughtered as being affected with this disease, at a cost of $32,080.66, distributed as follows:—

	Suspected and Quarantined.	Slaughtered.
Quebec.		
District—		
Compton	4	2
Saskatchewan.		
District—		
Assiniboia	1	
Battleford	13	1
Humboldt	1	
Moosejaw	411	22
Prince Albert	17	1
Regina	1	
Saltcoats	7	
	451	24
Alberta.		
District—		
Calgary	10	1
Edmonton	13	
Macleod	56	159
Medicine Hat	873	184
Red Deer	178	24
Strathcona	3	
Victoria	6	
	1,139	368

HORSE MANGE.

This disease continues to furnish work for our inspectors in various parts of the country, but the outbreaks have been small, isolated, and readily controlled except when the owners of the diseased animals are careless in carrying out the necessary treatment.

Province.	Outbreaks.	Animals Affected.	Animals Quarantined.
Quebec	6	9	12
Ontario			107
Manitoba	2	4	22
Saskatchewan	41	194	303
Alberta	3	5	26
	52	212	470

A total of 11,661 horses and 30 mules were inspected on being presented for shipment from the quarantined area in Alberta and Saskatchewan.

CATTLE MANGE.

Progress has been made in dealing with the disease, and it has been found possible to further reduce the area under special mange quarantine. This now comprises all that portion of the provinces of Saskatchewan and Alberta bounded by the international boundary, the Rocky mountains, and a line drawn from the Rocky mountains along the northern boundary of the Stoney Indian reserve to the line between ranges 5 and 6 west of the Fifth meridian, thence north along that line to the line between townships 34 and 35, thence east along that line to the line between ranges 10 and 11, thence south along the line between ranges 10 and 11 to the line between townships 25 and 26, thence east along that line to the line between ranges 3 and 4, thence south along that line to the line between townships 19 and 20, thence east along that line to the Fourth Principal meridian, thence south along the Fourth Principal meridian to the line between townships 16 and 17, thence east along that line to the line between ranges 17 and 18, thence south along that line to the line between townships 12 and 13, thence east along that line to the line between ranges 15 and 16, thence south along that line to the international boundary.

This substantial reduction in the area under restriction will benefit a large number of settlers and ranchers in the part now made free, by relieving them of the necessity of dipping their cattle, and allowing free movement of stock. Additional portions of the mange area will be released from time to time as the disease is brought under control, until it is possible to release it all. Co-operation of stock owners will hasten the time when this can be done with safety.

Province.	Outbreaks.	Animals Affected.	Animals Quarantined.
Ontario			5
Saskatchewan	8	13	3,679
Alberta	70	1,551	26,709
British Columbia			90
	78	1,564	30,483

Some 51,617 cattle were inspected on being presented for shipment from the quarantined area in Alberta and Saskatchewan, and 105,441 cattle were inspected in Winnipeg on arrival from points west thereof.

RABIES.

In control of this disease it was necessary to impose quarantine in limited areas of Ontario, Saskatchewan, and Quebec. The measures taken were successful in stamping out the disease. No fatalities in human beings were reported.

In Ontario, 56 premises were quarantined on account of the prevalence of rabies in the adjacent districts, distributed as follows:—

District.	Premises Quarantined.
Bruce	1
Huron	17
Perth	10
Toronto	13
Waterloo	1
Wellington	7
York	7
	56

In Saskatchewan, 2 premises were quarantined on account of the prevalence of rabies in the adjacent districts, distributed as follows:—

District.	Premises Quarantined.
Qu'Appelle	1
Regina	1
	2

In British Columbia, 43 premises were quarantined on account of the prevalence of rabies in the adjacent districts, distributed as follows:—

District.	Premises Quarantined.
Nanaimo	29
Vancouver	13
Victoria	1
	43

SHEEP SCAB.

Some few flocks of sheep in Manitoba were affected with this disease, which was eradicated by dipping the affected flocks and controlled by a period of quarantine. The origin of the infection was untraced.

In Quebec, 30 sheep were quarantined at LaBaie, being suspected of sheep scab.

In Manitoba, 270 animals on 20 premises were found to be affected with sheep scab, involving the control of 799 animals on 21 premises, distributed as follows:—

District.	Affected.	Quarantined.
Brandon	48	48
Dauphin	204	627
Macdonald	18	124

In accordance with the Quarantine Regulations, 16,196 sheep imported into Canada were quarantined for the prescribed period of thirty days.

TUBERCULOSIS.

This disease is widespread throughout the world, and no district or province of Canada has escaped infection. Owners of cattle are not often alarmed at its presence, as they would be if it occasioned sudden death. Its slow, insidious progress permits the farmer or dairyman to imagine that it is of little consequence. An occasional death in the herd is looked upon as inevitable, and the disease pursues its way unmolested. If cattle owners were alive to their own interests they would take steps to protect themselves against the constant drain of this disease by cleaning up their herds and keeping them clean.

This can be done, and the cost of it is not prohibitive. The Health of Animals Branch has many herds under its control in which the disease has been got rid of and kept out, and this work could be extended immensely if owners desired it. There is a standing offer that the Health of Animals Branch will assist any stock owner who wishes to establish a clean herd and is willing to conform to the simple agreement that is necessary to successful co-operation. The assistance of the branch provides for free testing of the herd whenever necessary, and in furnishing advice as to the best method of dealing with reactors, should any be found. The owner, on his part, is required to provide buildings of such a character that sanitation is practicable, and isolation of reactors possible when found necessary.

Although this offer has been available for several years, and one might expect hundreds of stock owners to have taken advantage of it, it is disappointing to state that there are at the present time less than fifty herds under this control.

The problem of dealing with bovine tuberculosis is not an easy one. Its very immensity deters the pioneer in legislation, who feels that the ordinary methods of dealing with contagious diseases would be of no avail against an infection so widely disseminated. Added to this is the knowledge that the average farmer is not asking

to have the disease eradicated, and would probably resent any method of dealing with it that would cost him anything.

After much careful consideration of the whole subject, it was decided to attack the disease at the point where it is most dangerous to the human race. An attempt would be made to prevent the sale of tuberculous milk in cities and towns and to ensure that the milk supply should be derived solely from cows that had passed the tuberculin test. In order to secure the co-operation and goodwill of the citizens to this work it was decided to apply it only to such cities and towns as made a request for it and were already licensing dairies and keeping them up to a certain standard of cleanliness and sanitation. Provision was made for dealing with reactors in a liberal way, so as to minimize the loss to the owner as much as possible.

Adopting this plan, the following regulations were drafted and made law by Order in Council dated May 18, 1914:—

WHEREAS many cities and towns of Canada are endeavouring to ensure a pure and wholesome milk supply for their inhabitants, and especially to prevent the sale of milk from tuberculous cows;

AND WHEREAS it is deemed advisable and in the public interest for the Government to assist as far as possible this work;

THEREFORE the Governor General in Council is pleased to make and establish the following regulations relating to tuberculosis, and the same are hereby made and established accordingly:—

REGULATIONS RELATING TO TUBERCULOSIS.

1. The aid of the Department of Agriculture, as aforesaid, will be given to such cities or towns having a population of not less than five thousand persons as shall have secured the necessary provisions under provincial legislative authority for the purpose of agreeing to the present regulations.

2. The Government of Canada will assist any city or town which shall have signified in writing to the Veterinary Director General its desire to have the aid of the Department of Agriculture in controlling bovine tuberculosis in the cows supplying milk and cream to the said city or town, provided the said city or town shall have stated in its application for the aid of the Department of Agriculture, as aforesaid, that, being thereunto duly empowered by law, it will undertake and provide that:—

(*a*) Dairies in which milk or cream are produced for sale therein shall be licensed.

(*b*) No license shall be issued unless the dairy conforms to the required standard.

(*c*) The standard shall require that the stable shall have an ample amount of air space, and at least two square feet of window glass for each cow, and shall be well ventilated, drained, and kept clean and sanitary.

(*d*) After two years from the date of the first test of the cattle of any dairy, the sale within the said town or city, of milk or cream from any herd shall be prohibited unless the said herd shows a clean bill of health from the Veterinary Inspector.

(*e*) An inspector or inspectors shall be appointed and paid by the said city or town, whose duty it shall be to see that the undertakings and provisions, as aforesaid, are carried out, and that the cows are kept clean and properly fed and cared for.

3. The Veterinary Director General, on receiving notice in writing from any such municipality of its desire to have the assistance of the Department of Agriculture, as aforesaid, shall forthwith make inquiry, and if satisfied that the foregoing requirements are being carried out, shall send Veterinary Inspectors to inspect the said cows.

4. Veterinary inspectors shall use the tuberculin test and also make a careful physical examination of the cows, in order to determine whether they are healthy or not. Dairy bulls shall also be examined and subsequently treated in the same way as cows.

5. Following the examination and test, the diseased cows and reactors shall be dealt with as follows:—

(*a*) Cows which in the opinion of the inspector are affected with open tuberculosis and are distributing the germs of the disease through the milk, fæces or sputum, shall be sent to an abattoir under inspection and there slaughtered as soon as conveniently can be done. When no such abattoir is within reasonable distance, the cows shall be slaughtered in the presence of the inspector, who shall direct how the carcasses shall be disposed of.

(*b*) Reactors to the test shall be separated from non-reactors as effectively as possible (suspicious animals shall be classed as reactors), and the owner shall be given the choice of disposing of them in one of the following ways:

(1) Immediate slaughter.

(2) Slaughter after they have been prepared for the block, by drying off and feeding.

(3) Retaining them in the herd, and selling no milk or cream until it has been pasteurized.

6. Compensation shall be paid to the owner of the herd for all cows slaughtered under these regulations, upon the following basis:—

(1) One-half the appraised value of the cow if destroyed as a case of open tuberculosis.

(2) One-third the appraised value of the cow if destroyed as a reactor at the request of the owner.

(3) Valuation shall be made by the inspector, and shall not exceed the maximum valuation for cattle as specified in section 6 of the Act.

7. The salvage from the carcass shall be paid to the owner of the cow in addition to the compensation, provided compensation and salvage together amount to less than the appraised value; if more, the surplus shall be paid to the Receiver General.

8. No compensation shall be paid to the owner unless, in the opinion of the Minister, he assists, as far as possible, in the eradication of the disease by following the instructions of the inspector as to disinfection, etc.

9. No milk or cream shall be sold from a herd containing reactors unless such milk and cream are properly pasteurized. The inspectors of the municipality shall see that this provision is effectively carried out.

10. Tests and examinations of the herds shall be made whenever deemed necessary by the Veterinary Director General, and after each test and examination the herd shall be dealt with in the manner aforesaid.

11. All cows bought by the owner of a herd, while under control, shall be submitted to the test and successfully pass it before being placed with the healthy cows.

12. When two successive tests fail to detect any reactors in a herd it shall be deemed healthy, and the Veterinary Inspector shall, when requested, give a certificate to that effect.

13. The existing regulations respecting tuberculosis, in so far as they may be inconsistent with the present regulations, are hereby repealed.

By Orders in Council dated December 23, 1904, and November 30, 1909, in virtue of "The Animal Contagious Diseases Act, 1903" (R. S. C., 1906).

(1) The disease of tuberculosis is hereby exempted from the operation of sections 3, 4, 11, 36, 37, and 38 of the "Animal Contagious Diseases Act, 1903" (R. S. C., 1906).

(2) Cattle which have reacted to the tuberculin test shall be deemed to be affected with tuberculosis, and shall be permanently marked in such manner as the Veterinary Director General may from time to time prescribe.

(3) Cattle which have reacted to the tuberculin test shall not be permitted to be exported from the Dominion of Canada.

Many inquiries regarding these regulations immediately reached the department, and in some cases these were followed by formal applications for federal aid. Unfortunately, in most of these cases it was found on inquiry that the conditions required in paragraph 2 had not been complied with. Sometimes the dairies were not under license, unless selling directly to the consumer; those selling to milk companies not being licensed. Sometimes the sanitary conditions of the dairies were such that they could not be accepted as fulfilling the required conditions.

In consequence of these and other reasons, only one of the applications for federal aid was found to comply with the conditions, and in this city, Saskatoon, the testing of the dairy herds is about to begin, the spring of 1915, and the result of it will be reported in our next annual report.

A total of 166 cattle were tested on being imported into Canada, all of which proved healthy; 1,296 cattle were tested for export, 39 of which reacted, and 1,257 proved healthy; 2,641 cattle were tested, some for shipment to different provinces of the Dominion and others in herds under the supervision of this department, 184 of which reacted, 40 were classed as suspicious, and 2,417 proved healthy; 3,384 cattle were tested by private practitioners, 463 of which reacted, 105 were classed as suspicious and 2,816 proved healthy; all reactors were permanently earmarked by a veterinary inspector in cases where the owner did not voluntarily destroy them.

ANTHRAX.

Outbreaks of anthrax occurred in two provinces, and were controlled by the application of the Pasteur method of vaccination of all exposed animals. The vaccine was prepared at our laboratory.

The following outbreaks were reported and dealt with during the year:—

Province.	Outbreaks.	Animals Quarantined.
Quebec	18	471
Ontario	8	185
	26	656

Some 1,080 doses of anthrax vaccine and 81,739 doses of blackleg vaccine were sent out during the year.

SCABIES IN FOXES.

On Prince Edward Island, 18 foxes were quarantined on 3 premises, being suspected of being affected with scabies.

ERGOTISM.

Inspector McKenzie, of Alberta, reports that on January 4 he visited the farm of W. P. Taylor, Carstairs, Alta., E. ½ 5-30-27 W. 4, and found a herd of ninety head of cattle, twelve of which were suffering from ergotism. Necrosis of the inferior third of the tail, about one inch of the superior extremity of the ear, and both hind feet, was observed in one animal. In two others, both hind feet had sloughed off at the pastern joint; in another an indented ring circumscribing the hind leg about 6 inches above the fetlock joint, below which the tissue was gangrenous; in three, one claw was absent.

The other visibly affected animals exhibited swellings and lameness in one or both hind fetlocks.

The animals had access to stacks of rye straw since about November 1. Owner advises that first symptoms were observed on or about the 1st of September.

Inspector McKenzie advised the owner as to treatment of animals only slightly affected and to burn all rye stacks.

The same day he visited the farm of Knud Christiansen, 10 miles east of Carstairs, and found a herd of thirty-four cattle, six of which were showing the effect of ergotism, being lame, having enlarged fetlock joints, and lying down continuously.

The grain bins and rye stacks were examined, and a considerable quantity of ergot found. The animals had been feeding on rye straw for four weeks, and a slight lameness was first observed ten days ago.

Mr. Christiansen informed him that a neighbour, who had fed rye to pregnant sows, had twenty-eight abort. All rye straw was burned, and the owner instructed to thoroughly clean the rye grain before feeding.

LABORATORIES.

Satisfactory work has been done in all the laboratories of the branch. The biological laboratory, Ottawa, continues to furnish all the tuberculin, mallein, anthrax and blackleg vaccines required, besides doing a considerable amount of research work. The other laboratories, at Lethbridge and Agassiz, have been fully occupied with the special work they have in hand. Special reports of the officers in charge of these establishments will be found as appendices to this report.

QUARANTINES.

Much progress has been made in the work of equipping the new quarantine station at Levis. Residences have beeen erected for the foreman and two permanent employees. The office building has been completed. All of the buildings that were fit to move have been transferred from the old to the new grounds, and most of them

have been erected. A well has been drilled, and pumping machinery installed, giving an ample supply of water to all the buildings, and also furnishing a system of fire protection. Progress has also been made in the clearing of loose stone from the paddocks, the erection of fences, and some necessary road-making. Much still remains to be done, but what has already been accomplished is sufficient to provide good accommodation for all the live stock likely to be imported during the present war. When the further equipment is completed, and other necessary improvements finished, we will have a quarantine station second to none.

The presence of foot-and-mouth disease in the United States, and the necessity for protecting our live stock from this highly infectious disease, led to the passing of an embargo upon live stock and its products, and of other commodities, such as hay and straw, which might carry the infection.

The regulations governing the embargo have been framed with the intention of giving the maximum protection to our live stock, with the minimum interference with trade. They have been modified from time to time as circumstances required, relaxing when danger no longer existed, and increasing their stringency when necessity arose. This has occasioned rather frequent changes, and our officers at the boundary have been called upon to enforce conditions which may sometimes have appeared unreasonable to importers. It is satisfactory to report that very little complaint has arisen.

At this date (March 31, 1915), the situation in the United States is still alarming. The infection is widely spread, and several boundary states are affected. We have hitherto escaped infection, and I trust may continue to do so, but until success has crowned the efforts of the Bureau of Animal Industry, and the disease is eradicated from the United States, we must continue our watchful vigilance.

The present situation has dangers peculiar to it that have not accompanied any of the other foot-and-mouth visitations in the United States. The necessity of furnishing the British Army with horses has forced us to permit American horses to traverse Canadian railways to Canadian ports of embarkation. While horses are not affected by foot-and-mouth disease, they may carry the infection upon their feet or hair, and thus communicate it to cattle, sheep, or swine. With this knowledge, care was taken to surround this traffic with every safeguard. Before loading the cars they were required to be cleansed and disinfected. Horses had to pass through a foot bath of disinfectant before reaching the car. No hay or straw was permitted to accompany the horses into Canada, and they were allowed to be unloaded only at designated yards. These were selected so that they could be isolated from all other live stock, and guards were placed to see that no horses were removed from the yards unlawfully, and no unauthorized persons allowed to enter.

Under these conditions the traffic has been going on without difficulty, and the danger reduced to a minimum.

SESSIONAL PAPER No. 15b

IMPORT TESTING.

IMPORT INSPECTIONS FROM UNITED STATES AND NEWFOUNDLAND.

Port.	Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Elephants.	Camels.
Charlottetown, P.E.I	5			2					
Halifax, N.S	147	1	1			2			
Sydney, N.S	64					3			
Yarmouth, N.S	8		3	6					
St. John, N.B	30								
St. Stephen, N.B	44		1						
McAdam Jct., N.B	14	1	6	4					
Debec Jct., N.B	19								
Woodstock, N.B	13								
Florenceville, N.B	1		1						
Aroostook Jct., N.B	94	2	3						
Grand Falls, N.B	8		1						
St. Leonards	5								
Edmundston, N.B	3		1						
N. B. General	10								
[1]Quebec, Que	1								
Comins Mills, Que	15								
Lake Megantic, Que	61	4	5						
Beauceville, Que	58								
Coaticook, Que	11		1						
Beebe Jct., Que	74		2				1		
Sherbrooke, Que	31	1	1	1	3				
Highwater, Que	40	2	4						
Aberdorn, Que	9		1						
St. Armand, Que	78	1							
Lacolle Jct., Que	66	5	5	140					
Noyan Jct., Que	26		1						
St. John's, Que	3								
Athelstan, Que	89	1	7	2					
Dundee, Que	56	2	152						
St. Agnes de Dundee, Que.	30	1	1						
Cornwall, Ont	6		4						
Prescott, Ont	57								
Morrisburg, Ont	25								
Brockville, Ont	10		7						
Kingston, Ont	9		1						
Cobourg, Ont	2								
Toronto, Ont	34	2							
[2]Niagara Falls, Ont	564	7	34			1		11	5
Bridgeburg, Ont	2,106	24	27	1,056	4	5			5
Windsor, Ont	23,726	117	52	343	36	8	2	3	8
[3]Sarnia, Ont	11,513	4	67	2,036		5	1		20
Sault Ste. Marie, Ont	89		9						
Port Arthur, Ont	2	1	3						
Rainy River, Ont	29		30		5				
Fort Frances, Ont	52	5	65			3			
Ontario General	1								
Emerson, Man	2,570	169	683	3,623	21	263		1	
Gretna, Man	658	19	99	7,698	2	4			
Snowflake, Man	41		9						
Bannerman, Man	147	5	20		11	2			
Manitoba General	2		8						
North Portal, Sask	2,729	124	1,976	141	10	2	2		
Northgate, Sask	72	4	10		2	1			
Wood Mountain, Sask	1,140	17	161	6,747					
Big Muddy, Sask	732	12	94						
Willow Creek, Sask	325	12	6	1,870					
Saskatchewan General	2								
Pinhorn, Alta	56	1		4,420					
Coutts, Alta	711	37	240	33,640	1		1		
Twin Lakes, Alta	205	2					2		
Alberta General	10	2							
Gateway, B.C	57								
Kingsgate, B.C	677	32	98	4		5			
Nelson, B.C	47	4	30	749		2			
Rykerts, B.C	6	1							
Rossland, B.C	18		71	40		1			

IMPORT INSPECTIONS FROM UNITED STATES AND NEWFOUNDLAND. —*Continued.*

Port.	Horses.	Mules.	Cattle.	Sheep.	Swine.	Goats.	Asses.	Elephants.	Camels.
Grand Forks, B.C.	54		8	128					
Midway, B.C	21		14						
Myncaster, B.C.	1								
Bridesville, B.C	24		12						
Keremeos, B.C.	103	5	1						
Osoyoos, B.C.	126	4	10						
Huntingdon, B.C.	200	2	86	5,381		4	1		
New Westminster, B.C.			27						
White Rock, B.C.	1,019	44	68	19,796		25	4		
Vancouver, B.C.	113	20	2	14,886		101			
Victoria, B.C	25		17	2,222	1				
White Horse, Y.T.	58	18	524	420	96				
	51,844	722	4,889	105,228	187	438	16	15	38

[1] 12 deer. [2] 1 llama. [3] 3 giraffes, 3 zebras. [4] 4 deer.

IMPORT INSPECTIONS FROM EUROPE AND ELSEWHERE.

Port.	Horses.	Mules.	Cattle.	Sheep.
Halifax, N.S.	1			
St. John, N.B.	21		44	
Quebec, Que.	5			427
Montreal, Que.	216	1		
Bridgeburg, Ont.	22			11
	265	1	44	438

IMPORT TESTING.

Some 5,339 horses were tested on arrival from the United States and allowed to proceed to their destination.

Entered at—	Number.	Entered at—	Number.
Charlottetown, P.E.I.	1	Windsor, Ont.	85
Halifax, N.S.	134	Sarnia, Ont.	59
Yarmouth, N.S.	2	Sault Ste. Marie, Ont.	4
St. John, N.B.	18	Port Arthur, Ont.	3
St. Stephen, N.B.	17	Rainy River, Ont.	22
McAdam Jct., N.B.	9	Fort Frances, Ont.	38
Debec Jct., N.B.	1	Ontario General	4
Woodstock, N.B.	7	Emerson, Man.	643
Florenceville, N.B.	7	Gretna, Man.	118
Arcostock Jct., N.B.	26	Snowflake, Man.	41
Grand Falls, N.B.	8	Bannerman, Man.	56
St. Leonards, N.B.	5	Manitoba General	1
Edmundston, N.B.	3	North Portal, Sask.	619
New Brunswick General	2	Northgate, Sask.	33
Comins Mills, Que.	15	Wood Mountain, Sask.	572
Lake Megantic, Que.	65	Big Muddy, Sask.	191
Beauceville, Que.	58	Willow Creek, Sask.	331
Coaticook, Que.	9	Pinhorn, Alta.	16
Beebe Jct., Que.	67	Coutts, Alta.	524
Sherbrooke, Que.	11	Twin Lakes, Alta.	158
Highwater, Que.	14	Alberta General	8
Abercorn, Que.	4	Gateway, B.C.	25
St. Armand, Que.	21	Kingsgate, B.C.	148
Lacolle Jct., Que.	14	Nelson, B.C.	12
Noyan Jct., Que.	9	Rykerts, B.C.	10
St. Johns, Que.	42	Rossland, B.C.	18
Montreal, Que.	1	Grand Forks, B.C.	58
Athelstan, Que.	13	Midway, B.C.	21
Dundee, Que.	7	Myncaster, B.C.	1
St. Agnes de Dundee, Que.	8	Bridesville, B.C.	23
Prescott, Ont.	12	Keremeos, B.C.	76
Morrisburg, Ont.	2	Osoyoos, B.C.	126
Brockville, Ont.	2	Huntingdon, B.C.	65
Kingston, Ont.	4	White Rock, B.C.	21
Cobourg, Ont.	2	Vancouver, B.C.	6
Toronto, Ont.	14	Victoria, B.C.	13
Niagara Falls, Ont.	315	White Horse, Y.T.	43
Bridgeburg, Ont.	204		

PURE BRED IMPORTS.

HORSES.

Breed.	Great Britain.	United States.	Elsewhere.	Total.
Belgian		5	8	13
Clydesdale	90	2		92
French Coach		1		1
Hackney	5	1		6
Hunter	5			5
Percheron		20	22	42
Pony	13			13
Shetland	109			109
Shire	3			3
Standardbred		42		42
Suffolk		1		1
Thoroughbred	4	7		11
Trottingbred		3		3
	229	82	30	341

CATTLE.

Breed.	Great Britain.	United States.	Total.
Aberdeen Angus		26	26
Ayrshire		1	1
Brown Swiss		1	1
Galloway		25	25
Hereford		121	121
Holstein		9	9
Jersey	94	32	126
Shorthorn		3	3
	94	218	312

SHEEP.

Breed.	Great Britain.	United States.	Total.
Cheviot		3	3
Cotswold	5		5
Dorset	73	1	74
Hampshire	288	5	293
Karakul		2	2
Lincoln	15		15
Oxford	2	11	13
Shropshire	28		28
Southdown	27		27
	438	22	460

SWINE.

Breed.	United States.
Chester White	10
Duroc Jersey	24
Poland China	4
	38

DISEASED IMPORT.

Port.	No. Horses in Infected Shipments.	No. of Shipments.	No. of Horses Infected.	Origin.	Action.
St. John, N.B.	13	1	1	U.S.	Reactor destroyed.
Aroostook Junction	2	1	1	"	Returned.
Gretna, Man.	4	1	1	"	"
Manitoba General	2	1	1	"	"
North Portal, Sask.	38	5	8	"	"
Wood Mountain	29	5	5	"	1 destroyed; remainder returned.
Big Muddy	7	3	4	"	Returned.
Coutts, Alta.	14	3	3	"	"
Twin Lakes	16	1	1	"	"
Alberta General	4	1	1	"	"
Nelson, B. C	4	1	2	"	"
Bridesville	2	1	1	"	"
Keremeos	27	4	5	"	"
Osoyoos	18	2	4	"	"
Victoria	5	1	1	"	"
	185	31	39		

ANIMALS INSPECTED FOR EXPORT.

Port.	Horses.	Cattle.	Sheep.	Swine.
Charlottetown to Newfoundland	79	930	474	153
" to United States			1	
Summerside to Newfoundland		86	195	
" to United States				1
Halifax to Newfoundland	3			
" to Great Britain	14,896			
" to St. Pierre and Miquelon		16	8	18
" to Bermuda	7	19		26
" to Demarara			50	
Mulgrave to Newfoundland		67	24	
Sydney to	28	723		
" to St. Pierre	1	106		
St. John to Great Britain	9,227			
Toronto to United States		28,114	5,472	1,760
" to Bermuda		169		
	24,341	31,033	6,224	1,958

STAFF CHANGES.

APPOINTMENTS, RESIGNATIONS, ETC., MARCH 31, 1914, TO MARCH 31, 1915.

VETERINARY INSPECTORS.

Appointments.—A. A. Black, V.S., W. G. Gillam, V.S., H. S. Manhard, V.S., R. M. Nyblett, V.S., R. Roberts, F.R.C.V.S., G. S. Thornewill, V.S.

Resignations.—J. A. Black, V.S., J. J. Farrell, V.S., J. T. M. Hughes, M.R.C.V.S., R. W. MacDonald, V.S., A. M. McKay, V.S., C. R. Richards, V.S., G. S. Thornewill, V.S., J. H. Vigneau, M.V.

INSPECTORS.

Appointments.—J. McNab, I. V. Law, H. H. Bulloch.

Resignations.—H. DeCook, W. McCullough.

CLERKS (OUTSIDE).

Appointment.—Miss E. Wilson.

Resignation.—Miss L. Cook.

Transfers.—Veterinary Inspectors: J. H. Shonyo, V.S. (from Meat Inspection), L. J. Demers, M.D.M.V. (from Meat Inspection).

Deaths.—Veterinary Inspector F. A. Jones, V.S.

OWING TO EXISTENCE OF FOOT-AND-MOUTH DISEASE IN THE UNITED STATES, FROM MARCH 31, 1914, TO MARCH 31, 1915.

Appointments.—G. W. Robinson, A. E. Horne, A. A. Joslin, John Gillespie, John H. Quinsey, R. B. Storey, E. P. Branigan, John Morris, J. Robinson, Harcourt Acton, F. Davies, George Moore, R. Donnelly, J. Pridham.

No longer required and services dispensed with during period mentioned.—R. B. Storey, J. H. Quinsey, G. W. Robinson, F. Davies, R. Donnelly.

Transferred to Meat Inspection.—J. Pridham.

OFFICERS OF THE HEALTH OF ANIMALS BRANCH WHO LEFT FOR ACTIVE SERVICE DURING THE PERIOD FROM AUGUST 4, 1914, TO MARCH 31, 1915.

INSIDE SERVICE.

C. H. L. Sharman, Chief Clerk; T. C. Evans, B.V.Sc., Assistant Pathologist.

OUTSIDE SERVICE.

Veterinary Inspectors.—E. C. Thurston, D.V.S., D. S. Tamblyn, D.V.S., B. R. Poole, V.S., Geo S. Thornewill, V.S., J. T. M. Hughes, M.R.C.V.S., R. W. MacDonald, V.S., J. J. Farrell, V.S.

Range Riders.—G. Cousins, S. Metze, H. C. Evans.

Clerk.—G. H. Unwin.

OBITUARY.

It is with great regret that I record the death of F. A. Jones, V.S., of Windsor, Ont. Dr. Jones entered the service of this branch in 1903, and was placed in charge of the port of Windsor in 1905, which position he held continuously until his death on February 6, 1915.

MEAT AND CANNED FOODS DIVISION.

The growth and development of the packing industry in Canada has required a corresponding increase in the staff of inspectors entrusted with the enforcement of the Meat and Canned Foods Act and regulations. It has also been necessary to replace several of our inspectors who have volunteered for Army service. This has led to an unusual number of changes in our staff, and I am glad to report that the work of inspection has not suffered in any way.

SESSIONAL PAPER No. 15b

During the year, the municipal abattoir of Toronto has been placed in operation, and, at the request of the city council, is under our system of inspection.

This is the first municipal abattoir to be operated in Canada, and, in keeping with the size and importance of Toronto, is thoroughly modern in every respect. The equipment includes a modern cold storage plant, and also a rendering house, where offal and other waste products are converted into marketable commodities.

The operation of this abattoir is watched with much interest by other cities, and its success will probably be followed by the erection of municipal abattoirs in other places.

STAFF.

Chief, Meat and Canned Foods Division.—R. Barnes, V.S.

Travelling Inspectors, M. and C. F. Division.—H. H. Ross, V.S., M. J. Kellam, V.S.

In charge of Montreal.—F. H. S. Lowrey, V.S.

In charge of Toronto.—L. A. Willson, V.S.

In charge of Winnipeg.—C. D. McGilvray, M.D.V.

In charge of Prince Edward Island.—W. H. Pethick, V.S.

Chief Travelling Inspector, Fruit and Vegetable Canneries.—C. S. McGillivray.

Canning Inspectors.—A. Bowlby, W. A. D. Graham, H. S. Switzer.

ADDITIONS TO STAFF.

Veterinary Inspectors.—F. R. Armstrong, B.V.Sc., Oluf Berntsen, V.S., *Chas. Brind, V.S., G. C. Cockerton, V.S., H. R. Estes, V.S., H. V. Fagin, V.S., C. W. Finnemore, V.S., T. E. H. Fisher, V.S., E. E. Howe, V.S., W. B. R. Knowles, V.S., G. A. Ledgerwood, V.S., F. Lefebvre, M.V., J. E. M. Lefebvre, M.V., J. G. MacDonald, V.S., W. B. MacFadzean, V.S., G. M. Manning, V.S., C. A. Mitchell, V.S., G. A. Nicholl, V.S., J. H. Part, V.S., G. G. Pook, V.S., Wm. Seymour, V.S., G. W. Starnaman, V.S., Jas. Steen, V.S., H. C. Storey, V.S., J. McL. Stuart, V.S., S. L. Wall, V.S.

Lay Inspectors.—A. Angrignon, A. Ardill, A. J. Champion, H. L. C. Christman, T. F. Coleman, A. E. Harvey, A. E. Hawkins, R. F. Jackson, Geo. Jones, T. K. Kerr, E. J. Laidlaw, Geo. Murton, J. W. Nickols, T. O. Paquette, Henri Pilon, Jas. Pridham, A. E. Rutherford, S. R. Walkinshaw, W. H. Wheeler.

Canning Inspector.—H. G. Wilkinson (temporary).

TRANSFERS.

C. A. Mitchell, V.S. (to Laboratory), L. J. Demers, M.D., M.V. (to C. D. Division).

DEATHS.

S. B. Fuller, W. R. Monroe, V.S.

RESIGNATIONS.

F. W. Baumgartner, Oluf Berntsen, V.S., E. E. Howe, V.S., S. Jaques, B.V.Sc., G. M. Manning, V.S., W. A. Morrin, V.S.

DISMISSALS.

J. O. Guertin, M.V., J. McL. Stuart, V.S., F. A. Maccabee.

PROLONGED LEAVE OF ABSENCE.

On Active Service.—H. Colebourn, V.S., H. B. Collet, V.S., F. A. Daigneault, M.V., K. L. Douglas, V.S., H. J. Elliott, M.D.V., C. W. Finnemore, V.S., F. A. Walsh, V.S., O. Brunet, M.V., A. C. Compton-Lundie, V.S., H. D. Nelson, B.V.Sc.

* Formerly a lay inspector.

ESTABLISHMENTS UNDER INSPECTION MARCH 31, 1915.

No.	Name.	Place.	Inspectors.
1	Armour & Co.	Hamilton	A. C. Ramsay, V.S. J. G. Davidson, V.S. J. E. A. Duhamel, M.V. John Wright.
2B	Matthews-Blackwell, Ltd.	Brantford	W. Kime, V.S. J. E. Bennett, V.S.
2C	" "	Peterborough	W. A. Henderson, V.S. Wm. Tennant, V.S.
10	F. W. Fearman Co., Ltd.	Hamilton	C. J. Johannes, V.S. C. S. Cain, V.S. H. Garrett, B.V.S. Wm. Lawson, V.S.
11	Ingersoll Packing Co., Ltd	Ingersoll	R. D. Orr, V.S. A. G. Murray, V.S. W. J. Pedden, V.S.
13	Whyte Packing Co., Ltd.	Stratford	T. M. Pine, V.S. A. W. Beach, D.V.S.
16	Dominion Abattoir, Ltd.	London	W. R. Bell, V.S.
17	Jones Packing and Prov. Co.	Smiths Falls	J. B. White, V.S.
31	Chatham Packing Co., Ltd.	Chatham	J. R. Thompson, V.S. A. A. H. Carley, V. S.
2E	Matthews-Blackwell, Ltd.	Toronto	F. Fisher, V.S. D. R. Bone, V.S. J. W. Fisher, V.S. A. Ardill. J. A. McCabe.
4A	Wm. Davies Co., Ltd.	"	A. R. Torrie, V.S. J. H. George, V.S. J. E. M. Lefebvre, M.V. C. C. L. Wallace, V.S. J. R. Songhurst. Wm. Howard. P. J. Kelly. H. Newton.
5	Toronto Civic Abattoir	"	D. C. Tennent, V.S. F. A. McNally. V.S. A. C. Walker, B.V.S. J. A. Hodgins.
7	Harris Abattoir Co., Ltd.	"	R. H. Cook, V.S. T. W. R. McFarlane, V.S. S. L. Wall, V.S. G. C. Cockerton, V.S. T. E. H. Fisher, V.S. A. C. Tanner, V.S. E. Cox. A. E. Harvey. C. L. Brittain. W. S. Blainey.
7A	" "	"	D. Brown.
9	Gunn's, Limited	"	E. R. Farewell, V.S. F. L. Wingate, V.S. W. J. MacFadzean, V.S. J. H. Mumford. E. Hunter. T. J. Kerr.
18C	Swift Canadian Co., Ltd.	"	D. A. Irvine, V.S. J. E. Morse, V.S. T. H. Richards, V.S. A. A. Belanger, M.V. N. E. McEwen, B.V.Sc. C. S. Anderson, V.S. J. W. Nickols. J. T. Newton. E. E. White. P. Kingston.
28	W. Wight & Co.	"	G. C. Brownridge, V.S.
2A	Matthews-Blackwell, Ltd.	Hull, P. Q.	Wm. Moynihan, B.V.S. J. Langevin, M.V. A. W. Younghusband, V.S. John Terrence.

SESSIONAL PAPER No. 15b

ESTABLISHMENTS UNDER INSPECTION MARCH 31, 1915.—*Continued.*

No.	Name.	Place.	Inspectors.
21D	Matthew-Blackwell, Ltd.	Montreal	J. W. Symes, D.V.S. A. R. Douglas, V. S. J. N. L. Couture, M.V. G. W. Starnaman, V.S. T. O. Paquette. E. Lallemand.
42	Wm. Davies Co., Ltd.	"	C. H. Weaver, V.S. C. W. McIntosh, V,S. F. R. Armstrong, V.S. G. A. Ledgerwood, V.S. G. W. Walsh, Geo. Jones. H. Beaudoin. D. McDonald.
19A	Gordon, Ironside & Fares	Montreal	J. R. Young.
22	Montreal Union Abattoir	"	C. E. Dercme, M.V. W. H. James, V.S. R. D. Boast, V.S. E. C. Gauvin, M.V. J. Steen, V.S. A. J. Champion. Jas. Pridham.
24	Wm. Clark, Ltd.	"	E. G. Lemieux, M V. A. Angrignon.
25	Montreal Abattoirs, Ltd.	"	E. Dufresne, M.V. N. W. Reid, M.V. C. D. Bancroft, D.V.S. J. F. Campeau, M.V. R. Benoit. H. Pilon. A. E. Hawkins.
29	N. K. Fairbank Co., Ltd.	"	H. Mizener.
47	Société S.P.A.	"	H. Macey.
50	Davis & Fraser	Charlottetown	C. J. Bousefield, V.S.
18	Swift Canadian Co., Ltd.,	Winnipeg	J. D. Ross, V.S. F. C. Bishop, V.S. G. A. Nichol, V.S. H. R. Estes, V.S. J. G. McDonald, V.S. W. G. Williams. C. H. Johnston.
19	Gordon, Ironside & Fares, Ltd.	"	F. C. Jones, V.S. R. B. Dellert, V.S. J. L. Trudeau, M.V. C. Brind, V.S. R. H. Lyon.
20	Gallagher, Holman & Lafrance	"	A. R. Walsh, V.S. H. Pomfret, V.S. T. F. Coleman.
21	Western Packing Co., Ltd.	"	J. R. N. Harrison, V.S. J. R. English, V.S.
19B	Gordon, Ironside & Fares	Moosejaw	J. W. Purdy, V.S. S. G. Bright, V.S. J. A. Theoret, M.V. R. F. Jackson.
18B	Swift Canadian Co., Ltd.	Edmonton	H. C. Leslie, V.S. R. G. Tupling, B.V. Sc. W. B. R. Knowles, V.S. F. Lefebvre, M.V. G. G. Pook, V.S. E. J. Laidlaw. H. L. C. Christman. W. H. Wheeler.
23A	P. Burns & Co., Ltd.	"	L. Christian, V.S. H. V. Fagin, V S. L. H. Swail, V.S. L. R. Walkinshaw.

ESTABLISHMENTS UNDER INSPECTION MARCH 31, 1915.—*Concluded.*

No.	Name.	Place.	Inspectors.
27	Gainers, Limited	South Edmonton	Geo. Whitehead, B.V.Sc. J. H. Part, V.S.
23	P. Burns & Co., Ltd.	Calgary	J. A. McLeish, V.S. H. C. Storey, V.S. Wm. Seymour, V.S. D. E. Tulloch, M.R.C.V.S. T. J. McLelland. Geo. Murton. C. E. Smith.
23B	P. Burns & Co., Ltd	Vancouver	E. A. Bruce, V.S. J. Dickinson, V.S. J. G. Jervis, B.V.Sc. H. W. Mallett. A. E. Rutherford.

ESTABLISHMENTS temporarily under inspection during the year ending March 31, 1915.

No.	Name.	Place.
12	Prince Edward Island Railway	Kensington, P.E.I.
15	John Reop	Charlottetown, P.E.I.
33	Belkin, Lukatsky & Jamieson	Calgary, Alberta.
34	Sussex Packing Co	Sussex, N.B.
35	New Brunswick Cold Storage	St. John, N.B.
36	W. A. Leard	Charlottetown, P.E.I.
36B	W. A. Leard	Summerside, P.E.I.
37	Railway Freight Shed	York, P.E.I.
38	Railway Freight Shed	Cape Traverse, P.E.I.
40	Aylmer Canning Co	Aylmer, Ontario.
41	Prince Edward Island Railway	Bradalbane, P.E.I.
43	Steam Navigation Co	Charlottetown, P.E.I.
51	J. H. Myrick & Co	Tignish, P.E.I.
54	Halifax Cold Storage	Halifax, N.S.
57	P. MacNutt & Son	Malpeque, P.E.I.
61	W. S. Fraser	Murray River, P.E.I.
64	P. C. Gallant	Summerside, P.E.I.
65	Thomas Butler	Murray River, P.E.I.
66	John Munn	Murray River, P.E.I.

SESSIONAL PAPER No. 15b

DISEASES FOUND AT ESTABLISHMENTS UNDER INSPECTION.

Diseases.	Cattle.			Sheep.			Swine.			Poultry.
	Carcasses.	Portions.	Lb.	Carcasses.	Portions.	Lb.	Carcasses	Portions.	Lb.	Lb.
Abscess	10	23,926		11	367		7	2,739		
Actinomycosis	51	17,439			2			1,153		
Adhesions		9,990			848			8,729		
Arthritis	1						3	5		
Angiomatosis		2,508								
Anemia	2									
Bruises	147	39,566	67,034	42	630	105	58	18,791	74,052	
Carcinoma							1			
Cripples	43	270		1	37		13	7,546		
Cysts		39			3		3	451		
Cystitis	1						2			
Cysticercus Bovis	150	1,185								
" Cellulosae							478	95		
" Ovis					123					
" Teniucollis				1	99			6		
Congestion	1	30			136		3	2,078		
Cirrhosis		10			1			5,047		
Contamination			10,833					8	1,321	
Decomposed			96,103			5,449			136,374	
Dirty		15	423,081		3	1,678		608	48,199	
Emaciation	145			75			112			
Enteritis	2			1			91			
Emphysema	3	1		1			8	978		
Frozen								2		
Gangrene	4						4			
Hernia				2	9		1	53		
Hydraemia	17	2		8						
Hydremic cachexia				1						
Hypertrophy		2						30		
Hog cholera							1,084			
Immaturity	3,354									
Improper bleeding	187			47			131			
Inflammation	28			3			33			
Icterus	3			12			34			
Induration		56						99		
Johne's disease	3									
Moribund	11			2			13			
Metritis	16			7			22			
Mucoid degeneration	64									
Mammitis	1							27		
Melanosis	1	4					1	1		
Mouldy			3,301							
Necrosis	1	222			494		2	21,772		
Nephritis	8						13			
Parturition				1						
Pregnancy							6			
Parasitis		34,758		1	94,429		6	97,566		
Pericarditis	61			2			10			
Peritonitis	43			13			107			
Pleuritis	10			8			70			
Pneumonia	90			95			300			
Pyaemia or septicaemia	151			40			686			
Sexual smell							81	332		
Skin disease							3	975		
Scalded alive							5			
Sepsis							6			
Sarcoma	4						4			
Sapremia	3						21			
Sour	6	10	84,286			98		5	110,243	
Stale							8			
Septic infection	139						6			
Tuberculosis	3,219	20,590		2	1		3,977	723,117		
Tuberculosis pseudo				44	61					
Tumours	18	19			1		4	9		
Uraemia							14			
Various	20	15,314	754	2	171		42	226	1,768	2 227
Damaged by fire		3,123	75				7	11	19,562	
Total	8,018	169,079	685,467	422	97,418	7,330	7,481	892,465	397,519	2,227 and 388 carcasses.
Found dead	215			294			1,946			

The following summary shows the results of post mortem inspections of cattle, sheep and swine from April 1, 1914, to March 31, 1915:—

Cattle marked "Canada Approved"	522,407
Carcasses of cattle "Condemned"	8,018
Percentage of cattle "Condemned"	1·51
Portions of cattle "Condemned"	169,079
Sheep marked "Canada Approved"	446,751
Carcasses of sheep "Condemned"	422
Percentage of sheep "Condemned"	·09
Portions of sheep "Condemned"	97,418
Swine marked "Canada Approved"	2,590,857
Carcasses of swine "Condemned"	7,481
Percentage of swine "Condemned"	·28
Portions of swine "Condemned"	892,465
Total number of carcasses "Passed"	3,560,015
Total number of carcasses "Condemned"	15,921
Percentage of carcasses "Condemned"	·44
Total number of portions "Condemned"	1,158,962

In addition to the animals slaughtered at inspected establishments, the following amounts of dressed and cured meats and lard, etc., were received during the fiscal year from the United States and Australasia:—

Beef	lbs.	866,225
Mutton	"	472,265
Pork	"	11,707,567
Lard	"	56,831

During the course of re-inspection, the following meats were condemned:—

—	Cattle.	Sheep.	Swine.	Poultry.
	lb.	lb.	lb.	lb.
Bruised	67,034	105	74,052	
Contaminated	10,833		1,321	
Decomposed	96,103	5,449	136,374	
Dirty	423,081	1,678	48,199	
Mouldy	3,301			
Sour	84,286	98	110,243	
Damaged by fire	75		19,562	
Various	754		1,768	2,227
Total	685,467	7,330	391,519	2,227

Total amount condemned on re inspection, 1,086,543 pounds.

Customs statistics show that we imported and exported the following:—

—	Imports.	Exports.
Cattle (live)	1,683	185,924
Sheep "	110,663	43,292
Swine "		243,312
Beef	1,783,936	29,744,832
Mutton	3,451,812	1,064,963
Pork	10,011,591	116,179,362
Lard	703,882	2,692,734
Canned meats, etc	1,857,168	4,434,902

CAR AND YARD INSPECTION.

The enforcement of the special regulations for our protection against foot-and-mouth disease has thrown extra work upon the inspectors, and it has been necessary to add to their numbers. The work has been carefully and efficiently performed and has, in my opinion, contributed not a little to our protection from disease.

It has been found that the disinfectants offered for sale for such purposes as the disinfection of cars and yards vary greatly in strength. A preliminary investigation shows that some of them have very little value. We have therefore undertaken to test a number of commercial disinfectants, and will insist upon the use of such only as are proved to have sufficient strength.

TENTH INTERNATIONAL VETERINARY CONGRESS.

This report would be incomplete without some reference to the International Veterinary Congress, which I had the honour to attend as delegate from Canada.

First organized in 1863, through the efforts of a British veterinarian, Professor Gamgee, the initial meeting was held in Hamburg and attended by one hundred and two members. Every five years since that time the congress has met in various cities of Europe, including Vienna, Zurich, Brussels, Paris, Bern, Baden Baden, Budapest, and The Hague. For the tenth meeting the city of London was selected as an appropriate recognition of the fact that the originator of these congresses was an Englishman.

Originally founded with the object of arranging for concerted action against rinderpest and contagious pleuro-pneumonia, which at that time were causing immense losses in Europe, the work of subsequent congresses has been of much greater scope, and concerns all contagious diseases of animals and the best way of dealing with each in the interest of the country affected.

Sir John M'Fadyean, Principal of the Royal Veterinary College, London, and President of the Tenth Congress, says in his opening address:—

"With regard to the success of the congresses in promoting the objects for which they were founded, there can be no difference of opinion. Their primary purpose is to bring fresh views and supposed new discoveries in any department of veterinary science to the crucial test of criticism by the highest experts. Thus they serve to correct errors and to diffuse knowledge among the members themselves. It would be a mistake, however, to represent these congresses as existing solely for the purpose of eliminating error and extending knowledge among the members of the veterinary profession. The proverb that prevention is better than cure applies as forcibly to animal as to human diseases, and a glance at the programmes of past congresses shows how fully that has been realized by the members of the veterinary profession, since the great bulk of the papers and discussions have been concerned with the prevention of contagious diseases among the domesticated animals. But prevention nearly always requires concerted action enforced by legislation, which, in turn, must have the intelligent support of the people interested if it is to be effectual. One of the purposes

of the congress must, therefore, be to spread to the widest possible extent among the interested laity a knowledge of the fundamental facts regarding the causes of preventable diseases. There is no need to be dissatisfied with the work of past congresses in this respect, for to their influence one can trace many of the laws which during the last fifty years have been passed with a view to exterminating or holding in check the epizootic diseases of animals, including those which are communicable to human beings. It would, unfortunately, be easy to show that incalculable sums of money would have been saved by some countries had their governments paid earlier heed to the resolutions passed at some of these congresses."

The congress convened at Central Hall, Westminster, on Monday, August 3, a large number of delegates and their wives being present. The opening address was to have been delivered by the Rt. Hon. Walter Runciman, President of the Board of Agriculture and Fisheries, but, as he was unavoidably absent, the meeting was opened by Sir John M'Fadyean, who was elected president by acclamation, and addressed the meeting briefly, referring to the regret of the members in the absence of Mr. Runciman, and outlining the work of the congress.

Some routine business being transacted, an invitation was extended to representatives of foreign governments to say something to the meeting, the first to rise being Professor Dégive of the State Veterinary School, Brussels. Professor Bang, Veterinary School, Copenhagen, followed, succeeded by representatives from Brazil, Holland, Japan, Chili, Norway, Russia, Portugal, Argentine Republic, Roumania, Cuba, Italy, Sweden, Egypt and the United States. This list of countries is an indication of the worldwide influence of the congress, which had a list of 1,500 members.

The congress reassembled next morning, August 4, at 11 a.m. It was very evident from the small number of delegates present that little interest could be taken in the proceedings while the question of peace or war for England was in the balance. The opening words of the president voiced the sentiment of the meeting. A brief discussion followed, in which it was pointed out that there were no delegates present from any of the Central States of Europe, that members were rapidly leaving the congress, and that with such a diminished and diminishing attendance, the congress was no longer international. The logical conclusion followed,—to adjourn the congress indefinitely, in the hope that when peace returned it would be possible to resume its meeting. After transacting the necessary business to ensure the existence of the congress as an organization, the president declared the congress closed.

While regretting this sudden end of the congress, I cannot say that my visit to England was without benefit. I took the opportunity, while awaiting the date of my departure for home, of seeing Sir John M'Fadyean and Sir Stewart Stockman and learning of their investigations into various matters of interest to the veterinarian, as, for instance, contagious abortion of cattle, swine fever, etc. I visited the laboratory of the Board of Agriculture at Alperton on several occasions, and am under obligation to Sir Stewart Stockman and his assistants for their courtesy in showing me everything I desired to see. I also visited Professor Nuttall, at Cambridge, with whom our Dr. Hadwen has done some useful work. Professor Nuttall was extremely cordial, and gave me much useful information on ticks as disease carriers. I was also able,

while in London, to adjust some matters in connection with the export of live animals to Canada, so as to shorten the time necessary for a shipper to obtain a certificate of health.

In conclusion, I desire to express my thanks to the staff of the Health of Animals Branch for the loyal support they have given me in endeavouring to perform their duties promptly, efficiently, and tactfully, so as to avoid unnecessary friction with the public, and in particular I wish to thank Drs. Hilton and Barnes of the headquarters staff for their careful and untiring work.

I have the honour to be, sir,

Your obedient servant,

F. TORRANCE,

Veterinary Director General.

APPENDIX No. 1.

(G. Hilton, V.S., Chief Veterinary Inspector.)

OTTAWA, March 31, 1915.

SIR,—I have the honour to report that during the year ending March 31, 1915, I have been constantly engaged in an executive capacity at headquarters.

The period in question has been marked by unusual activity. In view of the necessity of enforcing special restrictive measures for the protection of our live stock interests against the possible introduction of foot-and-mouth infection, there has been a constant stream of correspondence.

Several of the staff are either on active service or are absent undergoing military training, preparatory to proceeding overseas. As substitutes have not been provided in every case, it has been necessary to utilize the services of every available member of the Branch to the best possible advantage. This has necessitated the frequent rearrangement of the work of the staff, and as much of this work is of an exacting nature, some difficulty has beeen experienced. The members of the staff engaged in this particular work accepted the situation and deserve great credit for their untiring energy and close application to their work.

I have the honour to be, sir,

Your obedient servant,

GEORGE HILTON,

Chief Veterinary Inspector.

APPENDIX No. 2.

(R. Barnes, V.S., Chief, Meat Inspection Division.)

OTTAWA, March 31, 1915.

SIR,—I have the honour to submit my annual report for the year ending March 31, 1915.

The period covered by the past twelve months has been one of the most important, as regards the number of animals slaughtered under inspection, since the inauguration of the work in 1907.

The very large increase in the number of hogs killed was due entirely to extra production in the western provinces. This surplus over previous years was well taken off by Canadian packers and by export to the United States. Prices, however, remained firm owing to the increased demand from Great Britain and the conditions produced by the war, which interfered to a considerable extent with the usual supply from Denmark and Holland. These factors, combined with the increased home markets which resulted from the establishment of mobilization centres for our Canadian troops, provided a steady outlet for our surplus hog products. Packers were therefore on the alert to increase their trade, and bought liberally, with the result that the prices paid to the producers were such as would undoubtedly prove remunerative. When the increasing freight rates, insurance, exchange rate, and difficulty in securing transportation are considered, the whole trade may be said to be in a very satisfactory condition with a reasonably fair prospect of remaining so for some time.

Unfortunately, a section of the Prairie Provinces, owing to drought, was unable to produce sufficient grain to continue the feeding of the live stock, with the result that during the early fall hundreds of hogs were rushed to the market in an unfinished condition. The marketing of such animals has a strong tendency to cause a general lowering of price and to imperil the high standard of Canadian bacon. This run was, however, of short duration, and any change which it may have produced in the market was soon overcome.

It is hoped that the enlarged production of live animals in the west will continue, as the facilities for disposing satisfactorily of the products at the present time and for some time to come are practically assured.

The total number of cattle killed shows a decrease when compared with previous years, yet Canadian packers secured and filled for the Allies some large orders of canned and frozen beef.

The number of sheep killed shows a decrease, which is no doubt due to the outbreak of foot-and-mouth disease in the United States, in consequence of which a prohibitory order was issued against the importation of live animals from that country.

It has been the custom in the past to import large numbers of these animals for immediate slaughter and consumption. It is hard to understand why stock-raisers in Canada do not give this branch of the industry more serious consideration as the number of sheep is, in proportion to area and population, much smaller than in other countries which cannot be considered as being any more favourably adapted for production and marketing.

Regarding the total slaughter the following statistics are submitted:—

Cattle,	530,425 head ;	decrease under 1913-1914	1,569 or	·29 per cent.
Sheep,	447,173 "	" " "	52,111 or	10·44 "
Swine,	2,598,338 "	increase over "	799,278 or	44·42 "

The provinces show increases or decreases as follows:—

Province.	Cattle.		Sheep.		Swine.	
	Head.	%	Head.	%	Head.	%
Ontario	+10,863	5·41	− 4,956	3·30	+446,714	50·05
Quebec	+14,492	7·16	− 5,821	3·84	+ 69,088	21·54
Manitoba	− 18,056	31·80	−10,858	20·66	+ 99,811	47·75
Saskatchewan	− 4,157	74·62	− 4,988	49·86	+ 38,220	96·50
Alberta	− 886	2·20	−21,718	32·86	+149,043	61·40
British Columbia	− 4,003	16·24	− 8,676	18·12	− 8,257	10·74
New Brunswick	+ 41	341·66	+ 5,465	9·01		
Nova Scotia			− 347	18·58		
Prince Edward Island	+ 137	6·64	− 212	1·60	+ 4,659	26·28

The percentage of slaughter for each province to the total for all Canada:—

Province.	Cattle.	Sheep.	Swine.
	Per cent.	Per cent.	Per cent.
Ontario	39·86	22·47	51·54
Quebec	40·85	32·56	15·00
Manitoba	7·30	9·32	11·87
Saskatchewan	·26	1·12	3·00
Alberta	7·39	9·92	15·08
British Columbia	3·89	8·77	2·64
Maritime Province	41	5·83	·86

These percentages show very little difference from last year.

The increases in killings for Eastern and Western Canada over 1913-14 were as follows:—

Eastern Canada	42·28 per cent.
Western Canada	49·00 "

While 1913-14 showed Eastern Canada to have a decrease of 10 per cent and Western Canada an increase of 146 per cent against 1912-13.

The increase in carcasses condemned is almost altogether made up of tubercular cattle condemned, the increase in carcases condemned being 11·71 per cent over last year, and in portions 41 per cent.

The number of sheep carcasses condemned is about 5 per cent over the number condemned last year, whereas the sheep slaughtered number about 52,000 less than a year ago. The sheep portions condemned call for no comment. A considerable amount of *Cysticercus ovis* has been found in sheep in Western Canada, which are, in most cases, I believe, of American origin.

While the number of carcasses and portions of swine condemned is higher than last year, the percentage on the killing is about the same.

I must again call attention to the large number of carcasses condemned for improper bleeding and bruises, caused by rough handling and the overloading of stock cars. The number of portions and pounds condemned for bruises is very much higher than in previous years.

The amount of hog cholera this year is very high compared with that for 1914, the carcasses condemned for this cause being about four times as many as last year.

The increase in hog killings in Ontario and Quebec must not all be attributed to increased production in these provinces, but is mostly made up of western hogs brought from Manitoba and Alberta, where the extra production has enabled them to keep up their high killing percentage and also to export large numbers to Eastern Canada and the United States, the latter amounting to over 240,000 head.

A large number of frozen dressed hogs have also been shipped to Great Britain and the United States during the winter months.

A large trade in dressed beef has developed with Great Britain, and large orders have also been received for canned beef for Army purposes.

The annual examinations were held throughout Canada on April 21, 1914, at which sixty-eight candidates presented themselves. Of this number, forty-five were successful and nineteen were appointed as officers of the branch.

On May 20, a special examination was held for the graduates of Laval University, nine of whom wrote, but only one of whom obtained the required number of marks, and was appointed.

The work of the different inspectors has been, on the whole, satisfactory. In the carrying out of such a measure as the Meat and Canned Foods Act many contentious matters are continually coming up. Our inspectors in charge of the different establishments have handled these problems in a very satisfactory manner, which is creditable both to themselves and the service to which they belong, and in adjusting these differences the managements of establishments under inspection have shown a splendid spirit of co-operation which is much appreciated.

The health of the staff has been fairly good considering the nature of their work. The constant handling of diseased conditions in the steam, draughts, and unnecessarily damp and wet slaughter floors, the examination of meats in chill rooms and freezers, and the supervision of shipments from outside platforms (all of which must be attended to) cannot be looked upon as a sinecure nor as particularly conducive to continuous robust health.

The work of Travelling Inspector Ross has been of the same high standard as in the past, yet it was found that, in order to properly supervise the work and bring it into a closer uniformity, the territory covered by him was too great to obtain the degree of efficiency aimed at. It was therefore decided to make a division, and M. J. Kellam, V.S., was detailed for duty as a travelling inspector, with headquarters at Calgary. His field extends from Winnipeg to the Pacific coast. This division of the work has been fully justified by the results obtained, as Dr. Ross has all the work that he can properly do in Eastern Canada.

The circulars issued from time to time with information regarding the manner in which the work should be carried on, as well as interpretations of the requirements of the Act and Regulations, are proving of value to the managements of establishments and to our officers, and have no doubt cleared up many points which would have tended to cause friction.

At the outbreak of the war in Europe, patriotism and willingness to serve the Empire were not confined to individuals outside our service. Requests for permission to enlist were received from so many of our officers that it was necessary to give the matter serious consideration. While the loyalty of the applicants for leave was appreciated, it should not be forgotten that the work carried on under the Meat and Canned Foods Act was one which had an important bearing on the health of those

who depend upon meat as a portion of their food. As this product forms a staple in the feeding of our soldiers as well as of civilians, it is essential that it be rigidly inspected to ensure its freedom from disease, more particularly at the present time when those who are defending our Empire are subjected to the hardships and trying conditions of warfare which in themselves are sufficient to affect the most robust constitution. This inspection can only be carried on by trained and experienced men. The urgency of the call for veterinarians, however, and the willingness of those who remained to carry on the work of those who wished to go to the front, were the deciding factors in granting leave of absence to eight of our veterinary inspectors.

During the year the first municipal abattoir in Canada was opened for business in the city of Toronto. This is a splendidly built and equipped plant, and it is hoped that it will be liberally patronized in order that it may prove a success financially. It is unnecessary to point out the need of similar establishments in other cities and towns, as this is well known and recognized. It is unfortunate that municipalities have not the power to control the meat supply by providing facilities for adequate inspection and sanitary slaughtering of animals intended for local consumption.

CANNED FRUITS, VEGETABLES, AND MILK.

In October I visited, with Inspector McGillivray, some of the canning factories in western Ontario, and was pleased to note the general improvement in sanitary conditions at such plants as were in actual operation at the time of my visit. I noted the care taken in examining the raw materials as they entered the plant, and the splendid supervision exercised by the management during the whole process of manufacture.

It appears to me that if the manufacturers of canned fruits and vegetables adopted a set of standards of quality for their products it would increase the consumption of such foods, as at the present time the purchaser has no reasonable assurance as to the contents of the can, either from the description on the label or the name of the brand under which it is sold.

Marked progress has been made in improving the quality of the evaporated apples offered for sale. Hundreds of samples were taken by our inspectors and forwarded to Dr. Shutt, Dominion Chemist, for analysis as to moisture. In cases where the sample showed a moisture content greater than that allowed by law, viz., 27 per cent, the product was held and owners were compelled to re-dry it until the moisture was within the legal limit, when it was released and permitted to be sold. While this procedure was the cause of inconvenience and delay to the packers, very little complaint was made, as it is an indisputable fact that the unsatisfactory condition of this industry in the past was due almost entirely to excessive moisture in the finished product. The work of preparing a bulletin on this product is progressing satisfactorily under the direction of Mr. McGillivray, and it is hoped that it will be ready for publication during the coming year.

The sanitary conditions surrounding the manufacture of condensed and evaporated milk have been very satisfactory, and the usual high standard of quality has been well maintained.

In conclusion, I desire to express my appreciation of the loyalty and co-operation of the members of the staff and of the managements of the establishments coming within the operation of the Act. Without such support the progress made could not have been accomplished.

I have the honour to be, sir,
Your obedient servant,

ROBT. BARNES,
Chief, Meat and Canned Foods Division.

APPENDIX No. 3.

(A. E. Moore, D.V.S., Chief Travelling Inspector.)

OTTAWA, March 31, 1915.

SIR,—I have the honour to submit herewith my annual report for the year ending March 31, 1915.

A large portion of my time this year has been devoted to controlling several very serious outbreaks of hog cholera, especially in the old hog cholera centres of the counties of Essex and Kent in the province of Ontario.

As in former years, I have visited and consulted with the field inspectors and instructed them in their various duties pertaining to this branch.

GLANDERS.

I am pleased to report again this year that I have not seen a case of glanders in Eastern Canada. This is indeed very encouraging, as many years of very hard and disagreeable work was necessary in order to control this disease. It is, therefore, very satisfactory to realize that our labours have not been in vain, and have proved of great benefit to the different communities where the disease was prevalent.

TUBERCULOSIS.

Supervised herds.—I have tested 228 cattle in herds under the supervision of this branch; 34 of these reacted, and 9 were suspicious.

Testing for export to the United States.—During the year I tested 19 cattle for export to the United States, none reacted; these were on four different farms.

HOG CHOLERA.

In April and May I was called to Montreal and found, on investigation, several outbreaks of hog cholera among the garbage-fed hogs near that city. Assisted by Inspector Demers we located all those feeding garbage, and immediately destroyed all their diseased and contact hogs. We also placed in quarantine all the other premises where garbage was fed. The infection was confined to four places, and fortunately did not spread to the adjoining farms.

Repeated visits have since been made among the garbage feeders near Montreal, and so far no further evidence of the disease has appeared.

In July one small lot of hogs became infected by garbage near the town of St. Johns, Que. These were properly disposed of and the infection promptly checked.

During the fall and early part of the winter there were, unfortunately, three extensive outbreaks of hog cholera in the counties of Essex and Kent, Ontario. I was constantly engaged for three months in supervising the control of these outbreaks.

The disease first started at Chatham, Kent county, about the middle of August, on two premises where garbage was fed. From these two centres the disease gradually spread until it was necessary to destroy hogs on about 200 premises in and around Chatham. The outbreak extended, among the farmers' hogs, from the city of Chatham well into the townships of Chatham, Dover, Raleigh, and Harwich.

The second outbreak started in the town of Kingsville, Essex county, on October 1 among a lot of garbage-fed hogs. The hogs had been affected for some weeks before it was reported, and the infection was badly spread before the inspector's arrival.

About two weeks after, other hogs in the district became infected and the disease spread rapidly from this time on (among the farmers' hogs) until it reached Harrow on the west, Cottam on the north, and Ruthven on the east. The infection particularly followed the Lake Shore road, and involved nearly every farm as far as Harrow.

In the third outbreak, the first case was discovered on October 6 on a farm at Amherstburg, Essex county. The origin of this outbreak was traced from hogs belonging to a fish company.

It was found that this company had been losing hogs for some time. It is thought that they contracted the disease by coming in contact with infected carcasses of hogs which were washed ashore at the fish company's farm, which is situated on lake Erie. This outbreak spread east as far as Harrow, principally along the Lake Shore road, but it got well back into the concessions before it was checked.

It is the practice in the fall of the year for the farmers in these corn-growing districts to allow their hogs to run in the corn fields; in fact, they usually have the run of the whole farm. If hog cholera is present on one farm this practice exposes a large number of hogs to the infection. Birds, especially pigeons and crows, which are very numerous in this district, feed on the droppings of the hogs, which contain small particles of undigested corn and are, therefore, a serious means of carrying the infection from place to place. Owing to the above conditions it is always extremely difficult to control outbreaks of hog cholera.

It was repeatedly demonstrated to us that hogs which were closely confined often escaped the infection. Special means were taken to have all hogs in the infected districts closely housed as quickly as possible. This was extremely difficult to enforce, but we persisted in it, and I am satisfied that it was this precaution that enabled us to finally control the outbreaks.

In January and February hog cholera broke out among the garbage-fed hogs at Ottawa and Kingston, but the disease was checked before the infection spread into the country.

You will observe that the origin of practically all the outbreaks of hog cholera this year has been the feeding of infected garbage.

VARIOUS.

On September 15 I visited Mount Laurier, Que., to inspect horses which were being treated by Dr. James. I found the disease to be pernicious anæmia. Several horses had died and others showed typical symptoms of the disease. By all accounts this malady has been in that district for some years.

Several reports of suspected anthrax were investigated but proved to be black-quarter or *hæmorrhagic septicæmia*. No actual cases of anthrax were seen.

I have the honour to be, sir,

Your obedient servant,

A. E. MOORE,
Chief Travelling Inspector.

APPENDIX No. 4.

Quebec, March 31, 1915.

SIR,—I have the honour to send my report on the operations of the Levis Animals' Quarantine for the year ending March 31, 1915.

There have been imported during that period, through this station, but very few animals as compared with the previous years, owing to importations from Great Britain having been prohibited on account of the existence of foot-and-mouth disease.

There were imported 445 animals as follows: 5 Belgian draught stallions for the Government of the Province of Quebec; 1 coach horse; 12 deer—3 males and 9 females—for Laurentide Pulp Co., Grand'Mere, Que.; 427 sheep—157 rams and 270 ewes, owned by the following persons: Colonel McEwan, Byron, Ont., 5 rams, 11 ewes, South Down; John Kelly, Shakespeare, Ont., 2 ewes, Hampshire; E. H. DeGex, Kerwood, Ont., 1 ram, 2 ewes, Lincoln; H. Lee, Highgate, Ont., 3 rams, 3 ewes, Lincoln; Guy Drummond, Beaconsfield, Que., 10 ewes, South Down; J. & D. Campbell, Woodville, 1 ram, Shropshire; W. J. Dryden, Brooklin, Ont., 2 rams, 25 ewes, Shropshire; Robt. Blastock, Donerail, Ky., U.S.A., 1 ram, South Down, 1 ram, 1 ewe, Oxford, 3 rams, 70 ewes, Dorset, 140 rams, 146 ewes, Hampshire.

I have the honour to be, sir,

Your obedient servant,

J. A. COUTURE.

APPENDIX No. 5.

TORONTO, April 8, 1915.

SIR,—I have the honour to forward annual report for the year ending March 31, 1915.

During the year my time has been occupied by departmental business at Toronto office of Health of Animals Branch of the Department of Agriculture, and in making investigations from time to time of reported outbreaks of contagious diseases at various points.

Conditions have during the past year changed somewhat from the usual routine, the serious outbreak of disease in the United States necessitating increased vigilance regarding importations from that country.

The European war, which necessitated the congregating together at Toronto of a large number of horses for military use, also required attention from the officers of this department engaged in the work at Toronto. A vast number of horses have been at intervals concentrated at Toronto; a close watch as to conditions was kept by our officers, and unremitting efforts were put forward in looking after the sanitary arrangements of the various concentration yards, and I am pleased to be able to report that nothing more serious than minor ailments was at any time observed.

Disinfection of stock cars occupied the attention of officers specially assigned to that duty.

Regarding contagious diseases of stock in and around Toronto, I am pleased to state that, while many investigations of reported suspected trouble have been made, nothing of a very serious nature, excepting hog cholera, has occurred, the trouble being energetically dealt with.

RABIES.

From time to time isolated cases have come to our notice in districts which were formerly the seat of this trouble. In each case either destruction of contact dogs or enforced quarantine was rigidly enforced, and I am pleased to state the percentage of cases has been greatly reduced.

HOG CHOLERA.

During the year several serious cases of hog cholera developed in vicinity of Toronto, the trouble, we believe emanating from hogs being fed on table refuse.

Every outbreak was energetically dealt with, special attention being given to rigid quarantine enforcement and disinfection of premises.

By visits and keeping in touch with owners of large piggeries on outskirts of Toronto, we are cognizant of existing conditions, and no time is lost in making investigation of any reported suspected trouble.

We have impressed on owners the necessity of keeping premises in sanitary condition and are doing our best to discourage the use of refuse for food.

SHEEP SCAB.

I am exceeding pleased to state that in this district at least the trouble is apparently eradicated, and that not one authentic case has been dealt with during the past year.

ANTHRAX.

During the year several investigations of reports of this disease were investigated and, with the exception of one case, vicinity of Georgetown, Ont., all proved to be trouble other than true anthrax.

GLANDERS.

I am pleased to report that not one case of glanders was found in this district during the past fiscal year.

I have the honour to be, sir,
Your obedient servant,

W. W. STORK.

NUMBER of Animals Imported into Canada at Port of Toronto, from April 1, 1914, to March 31, 1915.

Total number of horses for temporary stay			1
"	"	" permanent stay	12
"	"	mules for permanent stay	2
"	"	Canadian horses returning	21
"	"	horses entered Canada	34
"	"	mules entered Canada	2

EXPORT from Toronto from April 1, 1914, to March 31, 1915.

—	Cattle.	Calves.	Sheep.	Swine.
Number of animals exported to Great Britain	Nil.	Nil.	Nil.	Nil.
Number of animals exported to Bermuda	169	Nil.	Nil.	Nil.
Number of animals exported to United States	28,914	8,490	5,472	1,760

APPENDIX No. 6.

(W. H. PETHICK, INSPECTOR IN CHARGE, PRINCE EDWARD ISLAND.)

CHARLOTTETOWN, March 31, 1915.

SIR,—I have the honour to submit herewith my annual report for the year ending March 31, 1915:—

As your representative in the Health of Animals Branch, I have visited almost every part of the province, and am glad to state that the health of farm animals has been excellent and that no contagious disease coming under the operation of the "Animal Contagious Diseases Act" has been detected in my district, although quite a number of suspected outbreaks were promptly investigated, of which a special report was sent you at the time of each investigation.

As in former years, I have had the opportunity of meeting a large number of farmers and dairymen and discussing with them the more common contagious diseases of animals; also their care and management both in health and disease, dealing more especially with tuberculosis in cattle, and I am glad to inform you that the stock owners manifest an increasing interest in this important matter. I believe they would welcome any movement giving promise of the ultimate eradication of tuberculosis from the island herds.

Temperature charts and all information relating to tuberculin tests conducted under my supervision have been promptly forwarded to your department.

PORT INSPECTION.

Statements with reference to the inspection of live stock at Charlottetown and Summerside are embodied in the annual reports submitted by the officers at the ports mentioned.

INSPECTION OF FOXES.

A few small outbreaks of scabies were promptly dealt with and controlled, and special reports sent you at the time. I am glad to state that the general health of foxes in the island ranches has been satisfactory.

MEAT INSPECTION.

During the past year, particularly the winter months, my time has been very largely occupied in connection with the meat inspection service in this island. By the daily reports, which are promptly forwarded, you are fully informed regarding the nature and volume and all particulars concerning every phase of the work at each of the establishments under my supervision, consequently I presume that a detailed statement is not here required. I would, however, add that the careful and impartial enforcement of the meat inspection regulations at the several establishments doing an export business has led to a very strong and rapidly growing sentiment in favour of the competent inspection of meats, milk, and other foods for local consumption; in fact the Board of Health is at present asking for legislation along the line suggested.

I would record my appreciation of the willingness with which the officers associated with me in both divisions of your branch have discharged their duties, as well as the courteous treatment extended to us by the management of the several establishments and transportation companies with which we have had to do. I am also glad to acknowledge the helpful interest taken in our work by the Premier, the Commissioner of Agriculture, and his staff.

I have the honour to be, sir,

Your obedient servant,

W. H. PETHICK,
Inspector.

APPENDIX No. 7.

(C. D. McGILVRAY, INSPECTOR IN CHARGE, MANITOBA.)

WINNIPEG, MAN., March 31, 1915.

SIR,—I have the honour to submit herewith report in connection with the Health of Animals Branch in the province of Manitoba for the year ending March 31, 1915.

The work of the branch here has consisted in the carrying out of the various regulations and requirements of the Animal Contagious Diseases Act relating to animals quarantine and the control of diseases, as well also of the Meat and Canned Foods Act and the various regulations relating thereto.

DISEASES OF ANIMALS CONTROL.

The services of the officers detailed to this branch of the work have consisted in dealing with the control and eradication of such diseases encountered affecting animals, as are scheduled under the Animal Contagious Diseases Act.

The diseases dealt with have included glanders, hog cholera, mange of horses, sheep scab, and tuberculosis.

Investigations have also been made of such other diseases and conditions affecting animals as appeared to be deserving of consideration and attention.

GLANDERS.

The control and eradication of glanders in the province of Manitoba is, I am pleased to report, still showing satisfactory results. While the number of animals slaughtered during the present year has been slightly in excess of the preceding year, the increase has resulted from a larger number of diseased horses being on a given premises, rather than to an increase in the number of outbreaks.

Glanders Statistics for Manitoba.—The following summary shows the number of horses tested with mallein and destroyed for glanders during the year extending from April 1, 1914, to March 31, 1915:—

Horses submitted to the Mallein Test—	
First test	435
Second test	45
Third test	4
Horses found to react and destroyed for Glanders—	
To a first test	38
To a second test	5
Of this number, thirteen were clinical cases.	

Total compensation allowed, $5,313.33; being an average of $123.57 per animal.

Import Horses tested at destination—	
First test	261
Second test	5
Destroyed for glanders without compensation—two on second test.	
Total number of horses submitted to a 1st test	733
" " " " 2nd "	50
" " " " 3rd "	4
" " " destroyed for glanders	45

HOG CHOLERA.

This disease of swine has prevailed to some extent in certain parts of the province, the number of outbreaks and hogs which it was found necessary to destroy being in excess of the preceding year. Periodical inspection and supervision has been maintained by inspectors of the department in the districts where the disease has appeared, and the owners of hogs have been personally instructed regarding the nature and symptoms of the disease and precautionary measures to be adopted.

HOG CHOLERA STATISTICS FOR MANITOBA.

Number of premises visited	285
" swine inspected	6,386
" premises quarantined	17
" " on which the disease was found to exist	26
" diseased and contact animals destroyed	844
" animals killed for diagnosis and for food purposes under inspectors' supervision	50
Amount of compensation allowed for animals destroyed	$5,767.97

In connection with a small outbreak which occurred in the district of Kenora, in western Ontario, and which was dealt with by officers of this branch, the following number of animals and premises were dealt with:—

Number of premises visited	56
" swine inspected	594
" premises quarantined	11
" " on which the disease was found to exist	9
" diseased and contact animals destroyed	54
Amount of compensation allowed for animals destroyed	$332.83

In the case of all premises where the disease was found to exist, the diseased and contact animals were slaughtered in the presence of an inspector, and the carcasses disposed of under his supervision in a satisfactory manner, either by cremating or burying deeply. The premises were also thoroughly cleansed and disinfected under the personal guidance and supervision of an inspector, and were kept under observation and quarantine restrictions for a period of at least three months. No hogs were allowed to be again introduced or kept on the premises until the quarantine period had elapsed.

In the case of one owner of hogs who violated the quarantine restrictions, he was prosecuted and fined twenty-five dollars and costs.

MANGE OF HORSES.

This disease of horses has been found to exist to a slight extent. Any affected and contact horses were placed under quarantine restrictions and treated at regular intervals, under the supervision of an inspector, by means of the approved official mange preparation until cured of the disease. The harness and stable utensils, together with the premises occupied, were also thoroughly cleansed and disinfected under the supervision of an inspector before the animals were released from quarantine.

Number of horses inspected for mange	158
" affected and contact animals quarantined for treatment	29

SHEEP SCAB.

This disease has been found among several flocks of sheep in certain parts of the province. All suspected flocks have been carefully examined and the affected and contact sheep have been placed under quarantine restrictions pending satisfactory dipping, at least twice, at intervals of from ten to fifteen days apart. This work is done under the supervision of an inspector, by means of the official lime-and-sulphur

dip approved by the department. The premises occupied by the affected sheep are cleansed and disinfected with limewash and carbolic acid under the supervision of an inspector.

Number of sheep inspected	3,657
" diseased and contact sheep quarantined for treatment	775

TUBERCULOSIS.

During the past year, officers of this branch have submitted to the tuberculin test, 126 cattle intended for export to the United States, and 3 pure-bred cattle intended for shipment to British Columbia. Of this number, 3 reacted to the test and were permanently earmarked and their export prohibited.

Two herds of cattle which are under the control and supervision of the department were submitted to the tuberculin test twice during the year. In all, 120 tests were conducted, 5 animals being found to react to the test, which were earmarked and have been eliminated from the herds.

Fifty-five pure-bred bulls, purchased by the Live Stock Branch, have also been submitted to the tuberculin test, 10 of which were found to react, and were earmarked.

There has also been furnished to practising veterinarians in the province, tuberculin for the purpose of testing private herds, and charts have been received covering the test of 905 cattle, of which 216 reacted to the test and have been earmarked in accordance with the regulations relating to tuberculosis. The total number of tuberculin tests officially recorded during the year in Manitoba was 1,209, the number of reactors amounting to 234, being mostly among the dairy herds.

BLACK-LEG.

This disease has been reported as causing considerable losses among cattle in certain districts, in which it appears to be more or less indigenous. When the presence of the disease is established in any district, the owners of cattle are advised as to the true nature of the disease and to resort to protective inoculation or vaccination of the susceptible animals at proper intervals, together with their removal from known infected areas, and the proper disposal of the carcasses of any animals which have died from the disease, preferably by cremating them completely. From reports received, it would appear that this disease is apparently increasing in prevalency.

During the past year, 2,092 doses of black-leg vaccine have been sold to owners for the purpose of vaccinating their cattle.

INSPECTION OF STOCK AT THE WINNIPEG STOCKYARDS.

In accordance with the requirements of the regulations, all cattle originating west of Winnipeg have been unloaded and inspected at the Winnipeg stockyards, and animals destined for other points have only been allowed to proceed after being duly inspected and accompanied by the inspector's health certificate.

The number of cattle inspected at the Winnipeg stockyards during the year was as follows:—

Cattle destined to points east of Winnipeg	22,362
" " " west of Winnipeg	3,812
" " " in the United States	40,849
" for slaughter at Winnipeg	38,388
Total cattle inspected	105,441

Sheep inspections.—In accordance with Ministerial Order No. 40, there have been inspected at the Winnipeg stockyards, 10,369 sheep imported from the United States for immediate slaughter here.

Hog inspections.—During the month of August last, it was deemed advisable to commence a systematic inspection of all hogs arriving at the Winnipeg stockyards. During the year, 408,585 hogs have been inspected at the Winnipeg stockyards, of which 66,977 were exported to the United States.

Fees collected on inspections of export stock.—During the year fees were collected on inspections of animals intended for export to the United States, amounting to $1,118.

INSPECTION OF LIVE STOCK CARS AND YARDS.

In accordance with the requirements of ministerial order No. 37, all stock cars destined to Winnipeg, upon being unloaded or arriving empty, have been cleansed and disinfected with limewash and carbolic acid, before being allowed to proceed or returned to general traffic. This work has been done under the personal supervision of an inspector stationed at the stockyards for that purpose, who affixes to each car a card certifying to the date upon which it has been dealt with. During the present year we were able to make arrangements with the several railway companies here to have all their cars dealt with at a central point. This has been found to be a great improvement, and facilitates the work. During the year, 9,643 cars were cleansed and disinfected. The stockyards at Winnipeg, and at all other points throughout the province, have been cleansed and disinfected with limewash and carbolic acid at least once during the season, and at such other times as appeared necessary. This work has been done under the supervision of an inspector, and in the case of any yards being reported or found in an unsatisfactory condition, or poor state of repair, the attention of the railway authorities has been drawn to same, and they have remedied the conditions complained of. A marked improvement in the appearance and condition of the stockyards throughout the province is now noticeable.

ANIMALS' QUARANTINE STATIONS.

The animals' quarantine stations and inspection ports in Manitoba are located at Emerson, Gretna, Bannerman, and Snowflake.

EMERSON QUARANTINE STATION.

This station is located at Emerson, on the international boundary line, at a point where the Canadian Northern and Canadian Pacific lines of railway, and their American connections intersect. The officer in charge at this point is Inspector Bescoby. Besides the inspector in charge, a caretaker is also maintained at this point, whose services are made use of in assisting the inspector in charge, and more especially in keeping the yards and stables in good repair and cleanly condition. The yards and stables are disinfected with limewash and carbolic acid from time to time as required.

During the year there have been presented for entry and inspection the following animals:—

Horses	2,550
Mules	169
Cattle	683
Sheep	3,623
Goats	263
Swine	21
Fees collected	$586.27

One elephant was also inspected.

There have also been cleansed and disinfected at this point, 852 stock cars returning from the United States.

GRETNA QUARANTINE STATION.

This station is located at Gretna, on the international boundary line, and is conveniently situated between the Canadian Pacific railway and the Midland branch of the Great Northern railway, each of which lines has a branch spur into the quarantine yards. The officer in charge at this point is Inspector J. A. Stevenson. Besides the inspector in charge, there is also maintained a caretaker, whose services are made use of in keeping the stables and yards in a satisfactory state.

During the year there has been presented for entry and inspection the following number of animals:—

Horses	638
Mules	19
Cattle	99
Sheep	7,698
Goats	4
Swine	3
Fees collected	$295 46

There have also been cleansed and disinfected at this point any stock cars returning from the United States.

BANNERMAN QUARANTINE STATION.

This station is located on the B. S. and H. B. branch of the Great Northern railway at Bannerman, which is distant about 3½ miles from the international boundary line. The officer in charge at this point is Inspector F. J. Braund.

During the year there has been presented for entry and inspection the following number of animals:—

Horses	147
Mules	5
Cattle	20
Sheep	....
Goats	3
Swine	11
Fees collected	$62.20

SNOWFLAKE INSPECTION PORT.

Snowflake, which is an inspection port, is located on the Snowflake branch of the Canadian Pacific railway, distant about 3 miles from the international boundary line. The officer in charge at this point is Inspector J. C. Bonnett.

During the year there has been presented for entry and inspection the following number of animals:—

Horses	41
Cattle	9
Fees collected	$7.75

There was also presented for entry and inspection at Sprague, settler's stock comprising 2 horses and 8 cattle, which were inspected. The horses were submitted to the mallein test, to which one of them reacted and both were returned to the United States, the cattle being allowed to enter.

The following summary shows the total number of animals from the United States presented for entry and inspection at the several ports in Manitoba:—

Horses and mules inspected	3,571
" " submitted to a first mallein test	598
" " which reacted and were refused entry	2
Cattle inspected	819
" submitted to the tuberculin test	13
Sheep inspected	11,321
Goats inspected	270
Swine inspected	35
Fees collected	$951.68

One elephant was also inspected.

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EXAMINATION OF PURE-BRED STALLIONS.

During the year, on instructions received, the officers of the branch here have made an examination for soundness and suitability of ten pure-bred Clydesdale stallions being purchased by the Live Stock Branch; also one thoroughbred stallion standing for service in the province.

MEAT INSPECTION DIVISION.

The work in connection with this division has consisted in the carrying out of the various requirements of the Meat and Canned Foods Act, and the regulations relating thereto.

In accordance therewith, inspection is maintained at the following establishments at Winnipeg:—

The Swift Canadian Co., Ltd., designated as Establishment No. 18.
" Gordon, Ironside & Fares Co., Ltd., designated as Establishment No. 19.
" Gallagher, Holman & LaFrance Co., designated as Establishment No. 20.
" Western Packing Co. of Canada, Ltd., designated as Establishment No. 21.

During the year, an average staff of 14 veterinary inspectors and 4 lay inspectors has been assigned to and stationed at these establishment.

Supervision has also been exercised over the export of meats by retail butchers to points outside the province of Manitoba and prosecution proceedings were instituted in one case against a butcher for shipping unmarked meats, and issuing false certificates, a fine of fifty dollars and costs being imposed by the magistrate before whom the case was tried.

During the year, on instructions received from you, I spent three weeks lecturing on the Better Farming Demonstration train over the Canadian Northern lines of railway in the province of Manitoba, and delivered addresses to farmers on live stock matters at fifty-two places.

I also delivered an address before the Manitoba Cattle Breeders' Association on "Contagious Abortion," and before the Manitoba Swine Breeders' Association on "Hog Cholera," at their annual meetings held at Brandon on January 13, 1915.

I also delivered addresses at the Agricultural Conferences that were held under the auspices of the department during the month of March, 1915, at the following points: Morris, Emerson, Selkirk, Stonewall, Portage la Prairie, Neepawa, Carberry, Shoal Lake, and Russell.

All of which is respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

C. D. McGILVRAY,
Inspector.

APPENDIX No. 8.

(W. H. McKenzie, Inspector in Charge, Saskatchewan.)

REGINA, SASK., March 31, 1915.

SIR,—I have the honour to submit herewith report for the year ending March 31, 1915, in connection with the Health of Animals Branch in the Province of Saskatchewan.

From April 1 to May 21, I was stationed at Vancouver, being engaged in field and boundary inspection work. Acting under your instructions, I proceeded to Calgary on May 22 where I remained until January 7, during which time I performed inspection duties at the Alberta stockyards, and investigated a number of outbreaks of hog cholera in the districts immediately surrounding that city. I was temporarily transferred to Regina, arriving here on January 8. In this province I have personally dealt with two outbreaks of hog cholera, destroying seventy-nine hogs. I also submitted to mallein, and destroyed one horse. Practically all my time has been devoted to the office

GLANDERS.

While efforts towards control and eradication of glanders have not been rewarded during the past year by a marked decrease in the number of animals destroyed, as compared with the year immediately preceding, a reason can, I think, be found in the character of a number of the outbreaks with which your officers have had to deal, in which the infection had been transmitted to a large number of horses before the disease was detected.

Glanders Statistics for Saskatchewan.—Summary showing number of horses and mules tested and destroyed during the year by the various inspectors here.

Total number of horses submitted to			1st test	2,137
"	"	"	2nd "	556
"	"	"	3rd "	93
"	"	"	4th "	2
"	"	"	5th "	2
"	mules	"	1st "	16
"	"	"	2nd "	5

Total number of animals destroyed, including three which were not tested	186
Total valuation	$28,965.00
Total compensation	19,020.00
Compensation withheld on three horses valued at	435.00
Number of animals presenting clinical symptoms	52

NORTH PORTAL QUARANTINE STATION.

During the past year there has been presented for entry and inspection, at this station, the following number of animals:—

Horses	2,729
Mules	124
Asses	2
Cattle	1,976
Sheep	141
Goats	2
Swine	10
Fees	$404.33

NORTH PORTAL QUARANTINE STATION.—*Concluded.*

Horses tested	545
Second test	47
Third test	5
Mules tested	20
Second test	....
Third test	2
Reactors—	
First test	4
Second test	4
Cattle tested	10
Reactors	Nil.

BIG MUDDY QUARANTINE STATION.

During the past year there has been presented for entry and inspection, at this station, the following number of animals:—

Horses	732
Mules	12
Cattle	94
Fees	$134.25
Horses tested	185
Retested	10
Mules tested	6
Reactors	4
Cattle tested	Nil.

WOOD MOUNTAIN QUARANTINE STATION.

During the past year there has been presented for entry and inspection, at this station, the following number of animals:—

Horses	1,140
Mules	17
Cattle	161
Sheep	6,747
Fees	$641.95
Horses tested	570
Retested	20
Mules tested	2
Reactors	5
Cattle tested	17
Reactors	Nil.

NORTHGATE QUARANTINE STATION.

During the past year there has been presented for entry and inspection, at this station, the following number of animals:—

Horses	72
Mules	4
Cattle	10
Goats	1
Swine	2
Fees	$10.00
Horses tested	29
Mules tested	4
Reactors	Nil.
Cattle tested	Nil.

WILLOW CREEK QUARANTINE STATION.

During the past year there has been presented for entry and inspection, at this station, the following number of animals:—

Horses	325
Mules	12
Cattle	6
Sheep	1,870
Fees	$133.05
Horses tested	319
Mules tested	12
Reactors	Nil.
Cattle tested	Nil.

Summary showing total number of animals presented for entry and inspection and submitted to mallein and tuberculin tests at the different quarantine stations in this province:—

Horses inspected	4,998	(110)
Mules inspected	169	(2)
Horses submitted to 1st mallein test	1,664	
" " 2nd "	77	
" " 3rd "	5	
Mules " 1st "	44	
" " 3rd "	2	
Animals which reacted and were refused entry	17	
Cattle inspected	2,247	(247)
" submitted to the tuberculin test	37	
" reacted	Nil.	
Sheep inspected	8,758	(2)
Swine "	12	(10)
Goats "	3	
Asses "	2	
Fees collected	$1,323.58	

HORSE MANGE.

Outbreaks of this troublesome malady have been dealt with from time to time, and for the most part, have been confined to the districts of Macrorie, Dunblane, Gull Lake, and Neville.

On account of the severity of the weather it is absolutely dangerous to treat affected animals during the winter and early spring, as pneumonia, pleurisy, etc., are not unlikely to follow the treatment. Realizing this, you issued instructions to have this procedure discontinued, and insisted upon the strict quarantine of affected and contact animals, until the advent of mild weather. While this is the only safe course to pursue, it renders the eradication of mange in this province an infinitely more difficult matter than in a milder climate. This disease showed a slight increase over last year.

Total number of animals quarantined	296	(2)
" " affected	189	(2)

BLACK QUARTER.

As this disease is not dealt with under the Animal Contagious Diseases Act, reliable statistics as to its prevalency are not available. While approximately three times the quantity of vaccine has been sold this year as last, it does not necessarily follow that the disease is more prevalent than formerly, as a campaign has been inaugurated by the Provincial Department of Agriculture resulting in municipalities strongly advocating the use of vaccine for all young stock. From the numerous applications received for vaccine and literature relating thereto, it is obvious that stock owners appreciate the value of preventive inoculation.

Total number of doses of black-leg vaccine sold during the past year.	20,447
Instruments	319
Needles	274
Value	$1,216.10

TUBERCULOSIS.

The following will show what has been done in connection with this disease during the past year:—

Imports.—Thirty-seven (37) cattle were submitted to first test. No reactions.

Exports.—None tested.

Official.—(Herds under control and for Live Stock Branch.)

One hundred and thirty-seven (137) cattle were submitted to first test, of which ten (10) reacted, and two (2) gave suspicious reactions.

Ninety-four (94) were submitted to second test, of which eight (8) reacted, while five (5) gave suspicious reactions.

Seventy-one (71) were submitted to third test, of which seven (7) reacted.

Five (5) were submitted to fourth test, with no reactions.

General.—Under this heading are shown cattle tested by private veterinarians with tuberculin supplied by your department through this office.

Two hundred cattle were submitted to the first test, of which fifty-five (55) reacted, eight (8) were suspicious, and one hundred and thirty-seven (137) showed no reactions.

Total number of tests	544
" reactors	80

HOG CHOLERA.

This highly infectious disease has shown a slight increase over the preceding year. During the first nine months of the year just closed, serious outbreaks were dealt with in the Milestone, Fairlight, Estevan, and Saskatoon districts, but I am pleased to inform you that the prompt and energetic measures taken by your officers have achieved gratifying results, as we have been comparatively free from this malady since last January. Many suspected outbreaks have beeen investigated which proved to be the result of unsanitary surroundings and insufficient food. The policy comparatively recently adopted, of destroying apparently healthy hogs which have been in contact with diseased ones, has already shown marked results.

Total number of hogs quarantined	7,353
" " " destroyed as diseased	4,349
" " destroyed for post-mortem purposes	50
Value	$39,197.58½
Total compensation awarded	25,216.19
Compensation withheld on 197 hogs valued at	1,373.30

DOURINE.

Fortunately, this disease does not exist to any marked extent in this province. Nevertheless, your officers, being aware of its insidious nature, avail themselves of every opportunity of carefully inspecting all horses which manifest even the slightest symptoms. The suspected animals are placed under quarantine, samples of blood secured and forwarded to the laboratory at Lethbridge for the complement fixation test. Statistics relating to this disease will be furnished by Dr. Hargrave, under whose jurisdiction it is dealt with.

RABIES.

Two suspected cases of this disease were investigated during the past year, one in Saskatoon, the other in Regina. In neither case was a positive laboratory diagnosis made, nor were any affected animals discovered by your inspectors.

SHEEP SCAB.

This disease did not make its appearance during the past year.

INSPECTION OF LIVE STOCK CARS AND YARDS.

In accordance with the requirements of ministerial order No. 37, all empty stock cars arriving at or passing through Moosejaw, unless bearing evidence of having been so treated, are cleansed and disinfected under the direction of an inspector.

Total number of cars cleansed and disinfected, 2,084.

On account of the outbreak of foot-and-mouth disease in the United States, special measures were taken to prevent the introduction of infection through unsanitary stock cars, all such cars arriving at North Portal being cleansed and disinfected under the direction of one of your officers before being allowed to proceed into Canada.

Total number of cars cleansed and disinfected, 472.

The stock yards throughout the province are cleansed and disinfected under the direction of an inspector from time to time as exigencies require.

STALLION INSPECTIONS.

During the past year thirty (30) stallions were examined for soundness for the Live Stock Branch, and one stallion was examined for identification at the request of the Canadian National Records.

I have the honour to be, sir,

Your obedient servant,

W. H. McKENZIE,

Inspector.

SESSIONAL PAPER No. 15b

APPENDIX No. 9.

(J. C. Hargrave, Inspector in Charge, Alberta.)

MEDICINE HAT, March 31, 1915.

SIR,—I have the honour to submit herewith my report for the province of Alberta for the year ending March 31, 1915, in addition to which reference will be made to portions of Saskatchewan and British Columbia within which a part of the work of your department is under the supervision of this office. During this period the diseases demanding the greater portion of the time of your inspectors being, as was the case a year ago, dourine, hog cholera, and mange.

DOURINE.

In my last annual report it was necessary to refer to a very extensive outbreak of this disease in the southwestern portion of Alberta, which outbreak was actively contended with, and considerable progress made in controlling the situation. During the year just ended, the different affected premises remaining in quarantine from last year were further dealt with and from a number of them the disease was eliminated. A few of them, however, are still receiving our attention, together with other premises whereto the disease had extended and been found during the present year.

The number of infected animals found, while considerably less than a year ago, will convey to you the fact that the disease had extended to a much larger number of premises than at first thought. With reference to these additional premises on which the disease has been detected, in two instances it would appear to be a recurrence of the disease, as in both cases the disease was detected and dealt with and believed to have been entirely eliminated some six years ago.

Unfortunately the four large Indian reserves to the south of the main line of the Canadian Pacific Railway, in this province have the infection upon them, and with the trouble at times experienced in dealing with the occupants of these reserves, it has, at times, been a difficult matter to determine that any progress was being made. This is unfortunate, particularly as dourine existing on any of these reserves is a menace not only to the horses upon them, but also to horses in the surrounding districts, as in the case of two reserves, owing to the non-fencing, there is nothing to prevent the mixing of the horses from the surrounding country with those upon them. This is, of course, a very serious matter and one in which the inspectors require to secure the co-operation of all the horse owners in the neighbourhood.

The practice of a general testing of all stallions in the neighbourhood of any outbreak has been followed as heretofore in addition to which the majority, if not all, of the different herds of horses immediately adjoining the different Indian reserves are being dealt with as exposed or contact herds. You will, however, appreciate the fact that because of the unfenced condition of certain of these reserves, horses are free to stray on and off at will, and while an effort has been made to keep track of such estrays, this is practically impossible, particularly on the two large reservations, the Blood and Blackfoot.

The work throughout in connection with this disease has been prosecuted with every possible effort and all the inspectors giving attention to this work have rendered excellent services and in almost every case have received hearty co-operation from the stock-owners. The disease was also encountered to the south of Maple Creek, Sas-

katchewan, but whether introduced from Alberta or a recurrence has not been definitely determined. It would, however, appear to be confined to four different herds.

I must again refer to the excellent work performed at the laboratory under the direction of Dr. Watson, and to indicate the amount of work performed at that point and the attention given to the disease in the field; 6,194 doses of serum were collected and tested, out of which number 26 only were bad specimens and unfit for testing, a most creditable record for the field inspectors collecting such material, in a great many cases under most adverse conditions.

Statistics for Alberta.

Number of premises quarantined	185
" animals quarantined	1,139
" " slaughtered (including 11 registered animals)	367

Of the 367, six head valued at $656 were not compensated.

Value of remaining 361	$44,431 00
Compensation	29,619 63

In addition to this, one jack was secured and forwarded to the laboratory for experimental purposes; value $200.

Statistics for Saskatchewan.

Number of premises quarantined	77
" animals quarantined	450
" " slaughtered, 23 (including one pure bred).	

One of the number slaughtered without compensation; the remaining 22 were valued at $3,875; compensation, $2,583.19.

GLANDERS.

The amount of time devoted to this disease has been considerably less than during the previous two years, it being found necessary to make approximately only a little more than one-third the number of tests, with the result that 72 horses were slaughtered as compared with 99 a year ago and 151 two years ago. Practically all of the 72 slaughtered were the result of two outbreaks, one in the Stirling district southeast of Lethbridge, and the other in the vicinity of Calgary, the former being in a farming district, and the latter were horses belonging to construction outfits. These two outbreaks accounted for 62 of the 72 head; the remaining 10 cases were isolated cases and all found to the south of township 40.

Statistics Native Horses.

Number of horses tested once	950
" " " twice	218
" " " thrice	38
" " slaughtered on inspection	1
" " " first test	63
" " " second test	5
" " " third test	3

Value of the 72 head, $11,615; compensation, $7,743.32⅓.

Number of horses presenting clinical symptoms	19
Import horses tested once	11
Horses seized by customs and tested once	12
" " " " twice	4

MANGE.

It would appear that this disease affecting horses has been all but eradicated from the province, as during the year it was found upon three premises only, involving the control of 26 horses, of which number 5 only presented clinical evidence of mange. These figures, on being compared with the statistics for the two years previous, show

a considerable improvement, and there should be no difficulty in eliminating this infection during the present year, although, no doubt, isolated cases will continue to be found from time to time.

A considerable improvement is also to be noted in the figures for cattle mange, and during the year it was gratifying to be able to recommend to you the reduction in the mange area, removing therefrom a portion of the area in both Saskatchewan and Alberta, totalling some 352 townships, and, with the very slight amount of the disease detected in the Maple Creek district during the immediate past winter, it is possible that the result of the ensuing seasons' work may be such as to make a further reduction in the area by eliminating practically all of the area in Saskatchewan.

In addition to the cattle quarantined and dipped according to the regulations a large number of stockmen voluntarily dipped their herds, although no evidence of mange was detected.

Statistics for Alberta.

Number of premises quarantined	110
" cattle quarantined	26,709
" " dipped once	44,424
" " " twice	33,368
" " hand treated	621

Statistics for Saskatchewan.

Number of premises quarantined	8
" cattle quarantined	3,679
" " dipped once	13,506
" " " twice	12,568
" " hand treated	84

In the Kootenay district of British Columbia it was found necessary to quarantine two premises on account of this disease, involving the control of 48 cattle. The animals in question were shipped from within the mange area for immediate slaughter, but on reaching destination it was found that it would be some considerable time before this would be carried into effect, and it was considered advisable to eliminate any possible chance of the infection being introduced into the district; consequently, the two herds, with the exception of 13 that were killed, were treated, although none of the animals presented any evidence of the disease.

TUBERCULOSIS.

During the past year a considerable number of dairy animals as well as pure-breds were submitted to the tuberculin test, both by inspectors of the department and by qualified practitioners, the latter being supplied tuberculin by the department. The total number of tests made by inspectors of the department was 380; number of reactors, 19, all of which were ear-marked in accordance with the regulations.

Total number of animals tested by practitioners, 144. Of this number, 11 reacted and were also ear-marked.

BLACK QUARTER.

Reports continue to be received as to losses from this disease, but I am unable to state with any degree of accuracy whether it has been greater than in previous years. I am convinced, however, that a certain percentage of the loss attributed to this disease is due to poisoning by Death Camus (*Zygadnus Venenosus*), a poisonous perennial herb which is quite plentiful throughout the province but which, however, is gradually becoming recognized by stockmen, particularly sheep-men, who make provision against the loss by supplying their sheep-herders with powders of sulphate of aluminum and permanganate of potash.

During the year, stockmen have made greater use of blackleg vaccine. Twenty-five thousand seven hundred and ninety-five (25,795) doses were supplied by the office and inspectors of the province, as compared with seventeen thousand eight hundred and seventy-five (17,875) a year ago.

RABIES.

My previous report shows that this disease was introduced into the province some four years ago, and the following year apparently successfully eradicated, as last year and this year there has been no recurrence of the disease.

HOG CHOLERA.

In my last annual report reference was made to the increase of hog cholera in the province, and in a great number of cases due to the feeding of uncooked refuse and garbage from hotels and restaurants. It was thought, however, that breeders of hogs were commencing to realize the necessity of thoroughly cooking this material or discontinuing its use altogether. This year, however, owing to the failure of crops in the southern part of the province, feed was very scarce and in a great many instances owners were unable to purchase it, with the result that hogs either ran at large or were fed such refuse as could be found in the different cities, towns, and villages, with the result that the disease existed to a greater extent than ever before, and as was the case last year the more severe and larger outbreaks occurred in the immediate vicinity of three large cities of the province.

Needless to say every effort has been made by inspectors to interest the councils of the various cities in the proper disposal of this material, and to some extent more or less success has been achieved.

The disease was continually met with until towards the end of January, since when practically no further outbreaks have occurred.

Just what will be the result of the efforts put forward during the year of course remains to be seen, but I am of the opinion that the ensuing year will show a very large decrease as inspectors on every visit made have been particular to carefully instruct the owners regarding the various means by which the disease may be carried, and the necessity of thoroughly cleansing and disinfecting infected premises; and the distributing of departmental literature upon the subject must result in a more thorough and general knowledge of this disease and success towards its eradication.

Number of premises quarantined during the year	306
" hogs involved therein	17,552
" diseased and contact hogs destroyed	9,450
Value of 9,325 hogs compensated	$77,416.45
Compensation	51,610.50
Value of 120 hogs (including three strays) not compensated	890.00

In addition, there were postmortemed and removed from quarantined premises and slaughtered for consumption, 928 hogs. I must also mention that in the Kootenay district of British Columbia three premises were quarantined, the hogs thereon, numbering 44, were slaughtered, being valued at $404; compensation, $269.33.

BOUNDARY STATIONS.

Pinhorn Entries.

Horses (1 foal)	58
Mules	3
Sheep (lambs, 2,959)	4,420
Fees collected	$151.13

A customs seizure consisting of two mules and two horses was tested by the inspector in charge of the port, one of the mules reacting. All four head were returned to the United States.

Coutts Entries.

Horses.. .. ..(foals, 67).	711
Mules..	38
Cattle..	240
Sheep.. .. ..(lambs, 1,781).	33,640
Swine..	1
Fees collected..	$871.25
Number of reactors rejected..	3
" contacts rejected..	11

Twin Lakes Entries.

Horses..	265
Mules..	2
Jacks..	2
Fees collected..	$16.25
Number of reactors rejected..	1
" contacts rejected..	15

Coleman Entries.

Horses.. .. ..(3 foals).	57
Fees collected..	$12.75
Number of reactors	Nil.

Kingsgate Entries.

Horses..	677
Mules..	32
Cattle..	98
Sheep..	4
Goats..	5
Fees collected..	$125.65
Number of reactors	Nil.

I have the honour to be, sir,
Your obedient servant,

J. C. HARGRAVE,
Chief Inspector for Alberta.

APPENDIX No. 10.

(S. F. Tolmie, Inspector in Charge, British Columbia.)

VICTORIA, B.C., March 31, 1915.

SIR,—I have the honour to submit my annual report for the year ending March 31, 1915.

Boundary inspection work has required close attention during the year, and particularly so since the outbreak of foot-and-mouth disease in the United States. Great care has been exercised by your inspectors to enforce the foot-and-mouth regulations.

During the year, 1,757 horses, 35 foals, 43,813 sheep and 6 lambs, 133 goats and 3 kids, 4 deer, 466 cattle and 63 calves, 71 mules, 5 asses and 1 foal, and 1 hog were imported through the live stock ports of this province; $2,029.51 were paid in fees. One hundred and eighty-eight horses and mules were accompanied by Bureau of Animal Industry charts showing that they had passed the mallein test. Four hundred and forty-nine horses, mules and asses were subjected to the mallein test by your officials. Sixty-seven head were rejected as reactors and in contact animals. Eleven hundred and fifty head of horses, mules and asses were entered for temporary stay only. Of the above mentioned cattle, 125 belonged to settlers, 97 head were tested with tuberculin, while 66 head were accompanied by Bureau of Animal Industry charts. One hundred and fifty-eight head were brought in for immediate slaughter only.

Twelve cattle and three calves, nineteen sheep and two swine were inspected for export during the year. Summary of port inspection by ports is attached herewith.

GLANDERS.

Fortunately only a few cases of glanders have been encountered. Eighteen head of horses were destroyed on mallein test for this disease, six of which were clinical cases. The value of the horses destroyed was $2,350. Compensation paid amounted to $1,566.63.

RABIES.

Rabies appeared in Cowichan early in 1914 and a muzzling order covering Cowichan Electoral District was enforced in May of the same year. Later the disease appeared in Ladysmith, and a muzzling order was put in force covering that town on September 22. In all, some forty-six premises were placed in quarantine on account of rabies. Thirty-nine cases were dealt with, thirty-eight of which were in dogs, and one in a cow. It was necessary to prosecute for infraction of the regulations in 109 instances. Convictions were obtained in 100 cases, and $958 was paid in fines. This work was carried on by Inspector Maconachie in a very efficient manner. The diagnosis of the inspector on the ground was confirmed in laboratory tests by Assistant Pathologist Hadwen. Valuable assistance was received from the provincial and the municipal authorities in enforcing the regulations. At this writing it appears that I will be able to recommend the cancellation of the muzzling orders at an early date.

HOG CHOLERA.

Hog cholera was the most important disease dealt with in the province. In all, 1,670 hogs were destroyed, and valued at $15,316.60. Compensation was paid to the amount of $10,210.88. Compensation on 791 hogs and amounting to $3,845.95 was withheld on account of feeding garbage and infractions of the regulations. One hundred and nine premises were quarantined on account of this disease during the year. Your inspectors have visited the districts in which swine are kept and have disseminated as much information as possible concerning this disease and its prevention and have distributed a large number of hog cholera bulletins and copies of the regulations relating thereto. I feel that a great deal can be accomplished by the distribution of information among hog owners. As in previous years, a very large proportion of the outbreaks was on premises where the practice of garbage feeding was followed. A number of outbreaks were also directly traceable to swine brought from points outside the province. Only twenty-eight premises still remained in quarantine at the end of the year.

BLACKLEG.

Blackleg has caused loss in some districts, principally in the range sections. Twelve thousand, eight hundred and forty doses of blackleg vaccine have been distributed by your officers. Vaccination is becoming quite general as a preventive measure.

TUBERCULOSIS.

The Dominion Government herd of cattle at the Experimental Farm, Agassiz, has been tested by your inspectors, but no reactors were found. A number of cattle have been tested during the year for the Live Stock Branch in connection with their distribution of pure-bred sires.

FOOT ROT.

This disease appeared in a few farms, and the affected animals are now receiving treatment.

INSPECTION OF STOCK CARS.

Three thousand and sixty-seven stock cars were cleansed and disinfected under the supervision of your inspectors, and a number of cars entering Canada were returned to the United States on account of faulty cleansing and disinfection.

A few changes occurred in your British Columbia staff during the year. Inspector McKenzie was removed to Calgary. Inspector Richards resigned from the service, and Inspector Maconachie was transferred to Victoria.

Disease among cattle appeared in the Kamloops and Cariboo districts. Inspector Paxton and Assistant Pathologist Hadwen are conducting investigations in connection with these outbreaks, but no definite information is yet available concerning them.

I have the honour to be, sir,
Your obedient servant,

S. F. TOLMIE,
Chief Inspector for British Columbia.

IMPORT INSPECTIONS.—SUMMARY.

Port.	Fees.	Horses.	Sheep.	Goats.	Deer.	Cattle.	Mules.	Asses.	Burro.	Swine.
	$ cts.									
Vancouver	432 24	113	14,886	101	4	2	20	0	6	0
White Rock	838 55	1,019	20,535	25	0	68	24	4	0	0
New Westminster	10 20	0	0	0	0	27	0	0	0	0
Huntingdon	19 60	200	5,381	4	0	86	2	0	1	0
Bridesville	26 25	24	0	0	0	12	0	0	0	0
Myncaster	1 00	1	0	0	0	0	0	0	0	0
Keremeos	33 60	103	0	0	0	1	5	0	0	0
Osoyoos	18 25	126	0	0	0	10	4	0	0	0
Rykerts	0 60	6	0	0	0	0	4	0	0	0
Nelson	84 00	47	749	2	0	30	4	0	0	0
Rossland	92 55	18	40	1	0	71	0	0	0	0
Midway	55 25	21	0	0	0	14	0	0	0	0
Grand Forks	164 65	54	0	0	0	128	8	0	0	0
Victoria	77 97	25	2,222	0	0	17	0	0	0	1
	2,029 51	1,757	43,813	133	4	466	71	4	1	1

ANALYSIS OF IMPORTATIONS.—SUMMARY.

Port.	Horses.					Mules.			Burro, Tested.	Asses, T. S. O.
	B. A. I.	Tested.	T. S. O.	Ret. Can.	Lic. to Dest.	Tested.	B. A. I.	T. S. O.		
Vancouver	24	6	68	16	0	0	20	0	0	0
White Rock	18	21	962	18	0	0	0	24	0	4
New Westminster	0	0	0	0	0	0	0	0	0	0
Huntingdon	85	64	39	12	2	0	2	0	1	0
Bridesville	0	23	0	0	0	0	0	0	0	0
Myncaster	0	1	0	0	0	0	0	0	0	0
Keremeos	17	73	8	0	0	3	2	0	0	0
Osoyoos	0	122	3	0	0	4	0	0	0	0
Rykerts	0	6	0	0	0	4	0	0	0	0
Nelson	0	10	37	0	0	2	2	0	0	0
Rossland	0	18	2	0	0	0	0	0	0	0
Midway	0	21	0	0	0	0	0	0	0	0
Grand Forks	4	58	0	0	0	0	0	0	0	0
Victoria	14	13	3	0	0	0	0	0	0	0
	162	436	1,122	46	2	13	26	24	1	4

Of the above total horses tested, 2 were tested to clear and entry previously made.

SESSIONAL PAPER No. 15b

ANALYSIS OF IMPORTATIONS, CATTLE.—SUMMARY.

Port.	Cattle.						
	Settlers.	Show.	Tested.	B. A. I.	Grazing.	I. S. D.	Under 6 mos. old.
Vancouver	1	1	0	0	0	0	0
White Rock	36	0	7	24	1	0	0
New Westminster	0	0	0	13	8	0	0
Huntingdon	61	0	5	19	0	0	2
Bridesville	9	0	1	0	0	2	0
Myncaster	0	0	0	0	0	0	0
Keremeos	1	0	0	0	0	0	0
Osoyoos	8	0	2	0	0	0	0
Ryberts	0	0	0	0	0	0	0
Nelson	3	1	19	0	0	7	0
Rossland	0	0	12	0	0	63	0
Midway	0	0	11	0	0	0	3
Grand Forks	3	0	40	0	0	76	9
Victoria	3	0	0	4	0	10	0
	125	2	97	66	9	158	14

Of the above total cattle tested 5 were tested to clear entry previously made.

IMPORT INSPECTIONS.—SUMMARY.—REACTORS, RETESTS, REJECTIONS, ETC.

Port of	Horses.					Mules.	
	Held. Retest.	Reactors.	Suspected.	In Contact. Rejected.	Re-presented. Passed.	In Contact. Rejected.	Re-presented. Passed.
Victoria	5	1	2	2			
Nelson	4	2	0	1	1		
Osoyoos	0	4	0	24		2	
Keremeos	0	5	0	21	20	1	1
Bridesville	0	1	0	1			
	9	13	2	*49	21	3	1

* All returned to United States.

APPENDIX No. 11.

(C. Maconachie, Inspector, Cowichan District.)

MARCH 31, 1915.

SIR,—I have the honour to submit herewith a report covering my work under the Health of Animals' Branch (contagious diseases) during the period between the dates April 1, 1914, and March 31, 1915.

RABIES.

During this time I have been engaged, practically entirely, in dealing with the outbreak of rabies in the Cowichan electoral district and the city of Ladysmith.

The first case reported occurred in the city of Duncan on March 13 to 16, 1914. From this date onward, until the month of July, cases occurred with a certain amount of regularity, with periods of incubation averaging about twenty-three days. In July, two cases occurred within a few days of each other, with incubation periods reaching to about thirty and thirty-two days. From that time until the present the number of cases has considerably diminished. The length of the incubation period has become difficult of definition, but since in one case, manifesting symptoms on December 17, contact with a rabid subject was at least possible on some date between July 11 and 14, and as no other source of inoculation, since that time, can be determined, it appears not unreasonable to suppose that this incubation period was one of five months. The last known case occurred on January 24. In this instance again the incubation period was apparently an extended one, since contact probably occurred on or about August 17, making the period roughly five months. The majority of the thirty-nine known cases have been of the dumb form. In the Ladysmith area, nine known cases have occurred, of which only one took the furious form. In Nanaimo, three suspected cases have been reported, all of which have been investigated. Of these only one appeared at all suspicious. This case bore some resemblance to the dumb form of rabies, but making allowance for the fears of the people who made reports, I am inclined to class the case as one of distemper, with nervous symptoms. The case was not reported until after the death of the dog. No other cases have been reported in that neighbourhood since that time. In the Cowichan electoral district a muzzling order came into effect, by Order in Council, on May 14, 1914. In the city of Ladysmith a similar order became effective on September 22, 1914. These orders together affect a district of about 160 square miles, and have been of great assistance in controlling the outbreak.

In the Cowichan district the population is almost exclusively English. Of these, many have lived in India and have had, at least, considerable hearsay acquaintance with rabies. They are thus perfectly well qualified to judge of every manifestation and development of the disease, and the result, where it is not actual opposition, is well-pronounced scepticism and resentment, both sufficient to preclude the likelihood of active co-operation with the various officials engaged in suppression of the outbreak.

Another difficulty arises from the fact that three different bodies of authority are concerned, viz., provincial, civic, municipal. Each of these bodies, the provincial department, the city council, and the municipal council has at one time or another taken the ground that the matter of enforcement of the order is properly the duty of the Dominion Government alone. This position has been abandoned in each case, but the fact that it was ever occupied serves to indicate general feeling; consequently

the continued presence of an inspector of this department has been very necessary. At present, with the beginning of the warm weather, this necessity continues, since with a lessening in the number of cases, and a lengthening of the intervals between their occurrence, impatience is manifested at the continued enforcement of the order.

HOG CHOLERA.

Six outbreaks of hog cholera have been dealt with on Vancouver Island, and one on Mayne Island.

In dealing with this disease I have found recently that the practice of feeding swill is becoming much less general than formerly on Vancouver Island.

Hog raisers are apparently becoming aware of the danger of this practice, and even Chinamen are disinclined, generally, to take the risks involved in it.

BOUNDARY INSPECTION.

From November 7 to 17, 1914, I was employed at Huntingdon in boundary inspection.

I have the honour to be, sir,
Your obedient servant,

C. MACONACHIE,
Inspector.

SUMMARY CASES, Prosecutions, etc., Supplement No. 1 to Report of C. Maconachie, re Rabies outbreak Cowichan Electoral District, April 1, 1914, to March 31, 1915.

Number of Cases.			Number of Prosecutions.				Convictions.	Number of Dismissals.			Charge Withdrawn.			Amount of Fines and Costs.				Cases Prosecuted by Department.			Information Laid by No.— Inspector — Cases.		
Furious	Dumb	Total.	City.	Province.	Municipal.	Total.	Total	City.	Province.	Municipal.	City.	Province.	Municipal.	City.	Province.	Municipal.	Total.	City.	Province.	Municipal.	City.	Province.	Municipal.
														$ cts.	$ cts.	$ cts.	$ cts.						
*8	31	39	33	45	31	109	100	6	2	1		.....	1	260.50	400.50	287.00	958.00	1	....	....	18	42	18

APPENDIX No. 12.

(*J. H. Frink, Inspector, St. John, N.B.*)

St. John, N.B., March 31, 1915.

Sir,—I beg to submit my annual report covering work at this station.

Inspection export fat cattle and sheep from this port to Great Britain has ceased.

Inspection export horses.—This has been confined to horses for the allied armies in Europe, numbering 9,327. These animals, generally speaking, were in good condition and free from serious contagious diseases, common in large numbers of horses from many parts of the continent of North America, stabled together. The usual diseases of a catarrhal nature were present, and particular pains were taken, and with success, to prevent their spread among the horses owned and used by citizens, remount animals being thoroughly isolated and strict measures of cleansing and disinfection were pursued. Those animals not fit for shipment overseas, and which were to be sold among farmers and others, have been subjected to the mallein test, so that any danger of glanders being distributed from this source has been overcome.

Imports of cattle, sheep, and other ruminants from Great Britain have fallen off perceptibly, owing to war conditions, and the prevalence of foot-and-mouth disease—not only in Great Britain but in the United States.

CONTAGIOUS DISEASES.

Hog Cholera.—Two outbreaks of this disease in the vicinity of Moncton, N.B., in the winter of 1914 were followed by a third in May, on premises situated on the Irishtown road in the same district, all affected hogs having been garbage fed. The disease did not spread from the infected places, and they have been discharged from quarantine, diseased animals and contacts having been destroyed, and as far as known this province is free from this scourge.

Broncho-Pneumonia.—An outbreak of this disease appeared at Richibucto, N.B., About 200 pure-bred hogs were on these premises. A number of animals died, particularly young animals; some difficulty arose in determining the nature of this disease, and its complete identification was made at the biological laboratory at Ottawa. After occasioning considerable loss the disease disappeared as suddenly as it came.

Glanders in Horses.—The only case of glanders coming under my observation was found at the quarantine station here, in a number of horses imported from the United States. This animal reacted to mallein and was destroyed. The contacts were subsequently tested without reaction.

Tuberculosis.—The testing of cattle has been carried on at Experimental Farms at Nappan, N.S., and at Fredericton, N.B. These herds are now free from tuberculosis, and with a reasonable amount of care can be kept so. Tests were also carried out on supervised herds, and those reacting were voluntarily destroyed by their owners.

PREVENTIVE MEASURES.

The carrying out of all orders relating to foot-and-mouth disease has been vigorously attended to, and thus far with success, the railways and other common carriers co-operating heartily in the work of cleansing and disinfection of stock cars and yards.

Prosecution under the Animal Contagious Diseases Act took place at Fredericton, N.B., for infraction of regulations and orders, the defendant having knowingly and openly violated regulations governing the introduction of horses from the United

States. A conviction was secured and a suitable penalty imposed, which will have a salutary effect in the administration of this Act, this being the first prosecution under this Act in the province.

IMPORTATION OF HORSES.

From Great Britain.—(Clydesdales.)	21
" United States	27
" West Indies	3
Total	51

Importation of cattle from Europe.—Forty-four head of pure-bred Jersey cattle arrived here on 10th March from the Island of Jersey, and are yet in quarantine.

The quarantine station has been well maintained, and the work attendant has been satisfactorily performed.

I have the honour to be sir,
Your obedient servant,

JAMES H. FRINK,
Inspector.

APPENDIX No. 13.

(Chas. H. Higgins, D.V.S., Pathologist, Biological Laboratory, Ottawa.)

OTTAWA, March 31, 1915.

SIR,—I have the honour to present this my sixteenth annual report as an official of the department, and my thirteenth as its pathologist.

During the year we have experienced an increase of work in excess of that common to any similar period since the establishing of this laboratory. A very noteworthy increase has been occasioned by the requirements of the Militia Department, a result of the European war.

Circumstances have prevented the enlargement of the premises, a pressing necessity for many years past, and it is now doubtful whether an enlargement at the present site is desirable in view of the fact that many phases of our experimental work require a greater land area than is now available. It is to be hoped that an enlarged laboratory on a comprehensive scheme may be a possibility in the near future to meet with the growing demands of the live stock interests.

From our stock of small animals we have supplied eighty-one guinea-pigs for other laboratories.

The routine examination of specimens has consumed a great deal of our time, we having dealt with 817 series during the year.

I present herewith details connected with the various phases of our work during the year just ended.

LABORATORY STAFF.

The staff during the year has been the same as that of the previous year with the exception that during the month of October (20th) Dr. Evans was granted military leave for the purpose of forming a veterinary corps to be attached to the Canadian Expeditionary Force, and has since that time been on active service.

In December, I was delegated to attend the meeting of the American Society of Bacteriologists, held in Philadelphia, and at that time secured much valuable information for the improvement of our laboratory work.

A number of articles have been prepared during the year by members of the laboratory staff. A few indicated below, are presented as supplements to this report:—

I. Special Report: "The Care, Sanitation and Feeding of Foxes in Captivity" by Chas. H. Higgins, Pathologist. Reproduced herewith as Supplement No. 1.

II. "*Leucocytozoon anatis.*" *Parasitology,* vol. VIII, No. 1, June 25, 1915, by A. B. Wickware, Assistant Pathologist. Reproduced herewith as Supplement No. II.

III. "An economical Measuring Device," by Charles H. Higgins, Pathologist. This has not been published elsewhere but is presented herewith as Supplement No. III.

I have been engaged during the year in manufacturing various biological products and, upon Dr. Evans' departure, assumed the responsibility connected with the preparation of strangles vaccine.

The work on contagious abortion formerly in the hands of Dr. Evans was on his departure transferred to Dr. Reid, who has made satisfactory progress.

Dr. Wickware and myself have been able to care for the major portion of the routine, thus giving Dr. Reid an opportunity to spend more time upon this very

important subject. His findings indicate that satisfactory results are being secured, and while it is yet too early to draw definite conclusions we all believe that he is securing information that will greatly assist in controlling this very annoying malady.

As formerly, Dr. Wickware has assumed many of the investigations arising from the routine examination of material forwarded for purposes of diagnosis. In this connection he has been able to investigate a peculiar malady in ducks which seems to be associated with the presence of a leucocytozoon *(leucocytozoon anatis)* in the blood. His findings in this connection are presented as a special supplement to this report (Supplement No. II).

As formerly, Dr. Reid was granted leave of absence for the purpose of assisting the Faculty of Comparative Medicine of Laval University in Montreal.

Mr. N. M. Guiou was employed from May 16 to September 30 inclusive. As during the previous year his services were made use of in connection with our turkey experiments, he having full charge of the flock. In this work we secured some additional data in connection with the rearing of turkeys, but in the main our recommendations to turkey raisers remain the same, and will be found in Bulletin No. 17, entitled "Entero-hepatitis."

Mr. R. Fee, our caretaker, has as formerly been employed in connection with the various duties coming under his supervision.

Mr. D. Paquette has attended to the clerical work of the laboratory and, when not fully employed at such duties, his services have been utilized with features of the routine requiring attention.

Mr. A. Abraham has, aside from aiding Mr. Fee in his multifarious duties, been employed in bottling such products as we have disbursed, other than anthrax and black-leg vaccines, and has proved careful in this work.

BIOLOGICAL PRODUCTS.

We have conducted, through the year, the manufacture of the various biological products hereunder noted. As formerly, their disbursement has been through your office, and at times their preparation and packing has been a severe tax upon the small staff of the laboratory. Each product has presented its own problems, and we present herewith a statement indicating the disbursements during the year:—

—	Mallein.	Tuberculin.	Tuberculin Precipitated.	Strangles Vaccine.	Stock Bacterial.	Normal Horse Serum.	Black-leg Vaccine.	Anthrax Vaccine.	Outfits.	Needles.
1914.										
April	1,000						4,390	100	3	7,113
May							7,515		1	
June	3,000						9,465	1,160		
July	2,000	2,000					7,280			
August	2,500	2,000		2,072			4,160			
September	7,000			2,525	5,050	1,500	5,102		1	
October		2,000		100	130		9,260			
November			227				4,700			
December	4,000	2,000	250	15,000			12			
1915.										
January	2,000		200	200			5,212			
February	2,000	2,000		7,200			8,800			
March	2,000	2,000	15	1,000			10,200			
	25,500	12,000	692	28,097	5,150	1,500	76,096	1,260	5	7,113

The most important addition to our disbursements in the foregoing table is noted under "Strangles vaccine." The requirements in this connection have been almost exclusively for military purposes in connection with the Canadian Expeditionary Force. The use of this vaccine has been followed by satisfactory results.

ABORTION.

Dr. Evans had this work in hand up to the time of his departure, and since that time it has been in the charge of Dr. Reid. Dr. Reid has conducted a large number of advanced experiments, the object of which has been the immunization of cattle with a view to preventing further losses in treated animals. This work promises satisfactory results, but will naturally have to be conducted on a much larger scale than has been possible up to the present time before a definite decision can be reached concerning its value. Efforts are being made to secure the necessary animals for these experiments, and I trust that they will shortly be available.

Dr. Reid visited the Trappist monastery at Oka on January 18 last with a view of assisting them in finding the cause of losses experienced from abortion in a number of their cattle. He found that the losses in question were due to the presence of the infective agent of contagious abortion in their herd, and, at their request has carried out, with a number of their cattle, experiments having in view their protective immunization against this affection.

CAPONIZING OF TURKEYS.

We may mention that during the year, in addition to the work upon enterohepatitis, we caponized four of the male poults with the result that we can now state that the operation is easily performed and followed by a satisfactory growth thereafter. The flesh of the bird is greatly improved, and I think that it can safely be said that a turkey capon is fully as far ahead of the ordinary turkey as the capon is superior to the unsexed chicken. Further experiments in this connection are desirable, and as our experiments progress we hope more birds will be available for this purpose.

DISINFECTANTS.

During the year our studies have been continued on the germicidal action of a number of disinfecting fluids. This work, while occupying a considerable amount of time, is of such a nature that more attention could profitably be spent upon its laboratory problems.

We have at various times tested disinfectants in accordance with each of the several methods that have been published during the past twenty years, but for the work now in hand we use the method recommended by the Hygienic Laboratory.* We use the special sterilizing device suggested by the Lancet Commission, and have found this more satisfactory in the sterilization of the platinum needles than the wooden block specified by the Hygienic Laboratory method. We offer nothing of an original character regarding the conduct of the test at this time, but in order to give credit to those whose work has enabled the perfecting of the method, quote the authors, Messrs. Anderson and McClintic, of the bulletin in question as follows:—

> "In proposing this method we desire to make full acknowledgment of our use of the Rideal-Walker and the Lancet methods, especially the latter, as a basis for our work."

* Bulletin No. 82, April, 1912, Hygienic Laboratory, John F. Anderson; Thos. B. McClintic Public Health and Marine Hospital Service of the United States.

It is quite evident that in the development of any particular laboratory technique many factors enter which to the uninitiated are scarcely understood. The testing of disinfectants offers no exception to this rule, and the present method of the Hygienic Laboratory is undoubtedly the best that has been presented.

A large number of samples have been forwarded from your office with the request that we provide you with a statement of their phenol coefficients. This work has been carried out as requested, and from our findings it is evident that the whole problem of the control of disinfecting materials will require closer supervision than has heretofore been the case. This is in accord with the views presented in my reports of some years ago, but action seems more urgent than formerly owing to the increased value of phenol as an ingredient used in the manufacture of high explosives. We are not ready to make definite recommendations at this time, believing that more experience with some of the commercial products is necessary.

DOURINE.

On August 25, 1914, Dr. Wickware visited Smith's Falls for the purpose of investigating a suspected outbreak of dourine, and his findings in connection therewith were wholly negative.

On October 14 last, Dr. Evans visited Sherbrooke for the purpose of investigating a suspected outbreak of dourine. The history in this case indicated that the animal responsible came from Alberta, and the suspicion that dourine existed was subsequently confirmed. Dr. Wickware visited the same locality in November for the purpose of completing, in Dr. Evans' absence on active service, the measures necessary to control and eliminate this outbreak.

ENTERO-HEPATITIS.

We have, as during the past few years, conducted experiments with this affection. Fairly satisfactory progress has been made, but on account of accidents during the incubation of our eggs at the Poultry Division of the Experimental Farms Branch, the results were not as satisfactory as was anticipated at the beginning of the season. A bulletin was issued during the year as Bulletin No. 17 (Entero-Hepatitis) of the Health of Animals Series.

FOXES.

Early in the year you complied with the request of Premier Mathieson, of Prince Edward Island, and permitted me to make an investigation in connection with the losses experienced by fox ranchers upon Prince Edward Island. The first-hand knowledge secured during my short stay on the island made it possible for me to arrive at certain conclusions and, apart from the assistance I was able to render in connection with infectious diseases, I was also able to offer advice in connection with the general care and feeding of the young foxes. My full report is presented as a supplement to this report. (Supplement No. 1.)

POULTRY.

The necessity for fuller investigation into the losses experienced, not only by poultry fanciers but by farmers, is more urgent than ever. Many losses we have found to result from infection with tuberculosis, many from entero-hepatitis (turkeys), others from intestinal parasites, and many die from improper methods of feeding. The time which we are able to spend upon the various poultry disorders is limited, and has to be undertaken as our time permits. We believe that there is a sufficient field in this poultry work to continuously occupy the time of a single investigator, and we regret that the staff of the laboratory has not permitted our taking up a few of the many subjects more completely than has been possible.

The abnormalities presented at autopsies which are the result of purely anatomical deformities would seem to us to require an investigation with a view of so guiding breeders of high-class poultry that their matings may be made with a view to avoiding this difficulty.

If it is possible to take up this work in co-operation with the Poultry Division of the Experimental Farms Branch, I believe we could anticipate making very satisfactory progress provided the full time of one investigator was available at the laboratory. Our records show the increasing necessity of microscopic examinations and a full study of disorders before satisfactory advice can be given. At the present time we are unable to devote the time which this feature of our work seems to demand. The shortage of meat food products, the cost of feed, and the increasing numbers of people interested in poultry seem to us to indicate that greater assistance than we are able to offer is very desirable at this time.

Tapeworms in Poultry.—In view of the foregoing the following observations may be of interest. Repeated examinations of fowls at the laboratory indicate that tapeworm infestations are becoming more common or else are more readily recognized than has been the case heretofore. In addition to the larger tapeworms, microscopic tapeworms, first seen at the laboratory by Dr. A. B. Wickware, have been found with increasing regularity, and in every instance coming to our notice have been the cause of much loss, the result of unthriftiness and deaths in the flock. When these parasites are present in great numbers we have found that the intestines are the seat of an intense catarrhal enteritis in which the mucous membrane is severely eroded. Tapeworms, in addition, seem to throw an immense amount of work upon the gizzard, evidenced by the severe ulcerations in its mucous membrane. These ulcerations may be partly the result of a toxic principle secreted by the tapeworms. This feature we have been unable to investigate in a manner suggesting itself to us as insufficient time has been available for this purpose. We have also noted in these tapeworm infestations an enlargement of the glandular areas just within the opening from the caeca into the intestines. This enlargement and engorgement of these glandular areas is frequently seen in digestive disturbances, but is invariably present in verminous infestations. We have been able in the majority of cases to advise treatment that has been followed by good results. We know practically nothing, however, of the life-history of the various intestinal parasites outside the body of the fowls.

We have also observed a long slender microscopic round worm in a large number of cases either with or without other verminous infestations, round worms, large tapeworms, or the microscopic tapeworms. We are unable to contribute any data relative to the source of origin or to means which will assist in their absolute prevention. Further experimental data are required if our greatest service to the poultry industry is to be realized.

TUBERCULOSIS.

The experimental work with tuberculosis has included the testing of tuberculin prepared at the laboratory, and in this connection I may be permitted to point out that tuberculin prepared and tested at the laboratory, and subsequently tested in a larger scale at the packing houses has given satisfactory results.

We have in progress experiments upon cattle connected with the point of infection and its relationship to the channels of infection through the system of individual animals. Full details of this cannot at present be given, but we hope that progress may be made during the coming year, when a portion of this study will be completed.

Tuberculosis of poultry is more frequently observed than formerly. During the year a special bulletin was prepared by Dr. Wickware and myself and published as Bulletin No. 18 of the Health of Animals Branch series. This bulletin while of undoubted value to poultrymen, has no doubt enabled many to make their own

diagnosis. No suggestion can be made by me as to the prevalence of tuberculosis among poultry, there being no means of securing accurate statistics. It is my opinion, however, that the disease is far more prevalent than is desirable.

WATER EXAMINATIONS.

Routine water examinations have, as formerly, been conducted at intervals to determine the efficiency of the special sterilizing machines in the various government buildings. We are still able to report that water known to have passed through one of these machines has never shown evidence of sewage infection.

The foregoing is respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

CHAS. H. HIGGINS,
Pathologist.

SESSIONAL PAPER No. 15b

(Supplement No. 1, to Report of the Pathologist.)

THE CARE, SANITATION AND FEEDING OF FOXES IN CAPTIVITY.

INTRODUCTION.

Within a very few years the rearing of foxes in captivity has attracted more than ordinary attention. The very high value attached to pelts of exceptional quality naturally resulted in those who had been supplying the higher grades attempting to rear those wily animals under artificial conditions. For some years this was practically a secret industry, but the ever-increasing price of pelts led to offers being made for live animals with a view to using them for breeding purposes. From a very moderate figure the price has gradually increased, and now many of the choicest animals are capitalized at from fifteen to thirty thousand dollars per pair, with very few available.

It is natural that the maintenance of such valuable animals in captivity has, as in other lines of endeavour, presented its problems of care, sanitation, and feeding, which, in some instances at least, have been disastrous. Breeders are alive to the fact that there is no royal road to wealth in this industry; nevertheless, the returns have been great and progress has been made as new facts have been secured to reduce the hazard.

The purpose of this compilation is not to supply information which will prevent all future losses, but to point out some of the fundamental principles, the observance of which will, in a measure at least, assist in a fuller understanding regarding the problems confronting those now engaged in, or about to engage in, the business.

As a general consideration it is taken for granted that the keeper has had experience in the care of foxes under artificial conditions, is a keen observer and is possessed of sound judgment in their handling and management. He should be a person of unimpeachable integrity, for otherwise there will be difficulty in learning of leaks should such unfortunately occur. The utmost care should consequently be exercised in his selection, or serious failure may be anticipated at the outset.

While many consider that luck plays an important part in the financial success of fox farming, I believe that it is but a minor factor, and that a thorough knowledge of the animal, its vagaries at various seasons of the year, coupled with an understanding of methods of feeding and sanitation are the factors which will with greater surety lead to success.

In discussing the whole subject, I will endeavour to take up the various features under different headings in order that those desiring to consult this small treatise may do so with the least possible difficulty.

I may here acknowledge my indebtedness to the Veterinary Director General, Dr. Fred. Torrance, my chief, who detailed me to the investigation of this industry, to Premier Mathieson, through whose instrumentality I was permitted to visit Prince Edward Island, to Mr. Fred. L. Rogers, president of the Fox Breeder's Association, to Dr. W. H. Pethick, the inspector in charge of the Health of Animals Branch for Prince Edward Island, and to the many breeders, keepers, and investors who in every instance afforded me the opportunity to learn of their methods, their successes, and their failures. Without this assistance my mission would have been fruitless and the data for this compilation could not have been secured.

II.—SELECTION OF STOCK.

In the selection of stock for the breeding of any species of animals, the greatest care must be exercised, or serious financial loss and disappointment will follow. This is probably of greater import in the farming of foxes for profit than in the rearing of any other class of live stock. Many reasons exist for this, the principal being that the fur of the silver fox has from time immemorial been the fur of Royalty. The exploration and sentiment of those remote corners of the earth inhabited by the fur-bearing animals has progressed, till now the securing of fox pelts is presenting greater difficulties each year, and, furthermore, the difficulty of rearing these animals in captivity has presented insurmountable barriers.

The animals mature rapidly, and the returns have reached a figure which in many instances has placed poor farmers in affluent circumstances within a very short period.

If possible it is preferable to secure breeders from what is termed pure-bred stock, or stock that is known to be capable of reproducing its kind without a reversion of type. At the same time it must be borne in mind that the pelt value is the ultimate basis upon which the industry rests, and the only one to be considered when selecting the stock. In judging of the pelt value in breeding stock, another consideration enters, namely, the conformation and stamina of the individual, for without perfect conformation, deformities will be encountered in the progeny, and without a very high stamina, the progeny will be weaklings and succumb early in life, losing to their owner not only the pelt value and the individual but the profits which would otherwise accrue from such as future breeders. These considerations are paramount and will save much subsequent annoyance if thoroughly weighed at the outset.

Having borne in mind the foregoing considerations, the breeding of the progenitors of the stock selected should, in so far as it is practicable, be known as far back as it is possible to go. This ensures the fixity of the type and thus eliminates the danger of a recessive or sport* appearing in the progeny. Such recession not only has a tendency to depreciate the value of a given litter but the possibility of its recurrence in such a breeder's progeny is ever present. It is thus apparent that where the type is fixed, and it is known that the chances of a recessive or sport occurring are remote, the value of the pair and the progeny as breeders is greatly enhanced.

This also brings in for serious consideration the probabilities that may be expected from the introduction of silver, black, patch, or cross foxes for breeders. At the present time little or nothing is definitely known concerning this. Many hold that a fox is a fox regardless of colour or place of origin and that it may be mated in any manner without danger. Others, again, hold that nature has bred foxes of different varieties, each true to type, such as the Alaska blue, the Northwest black, the cross, the red, and the grey; that these types are fixed, and while in the first generation they may freely interbreed, this progeny being hybrids will be sterile or very nearly so. We get hybrids among equines by crossing the Jack and the mare or the stallion and the Jennet, yet these cannot be bred further. Among birds we know that domestic and wild geese cross, and while this cross results in the finest table bird known it does not go further, as the hybrids are sterile. Upon this basis it is argued that the various breeds of foxes have been fixed by some fundamental law of nature, and that these laws cannot be controverted by man's desire to secure valuable fox pelts, excepting along certain given lines which future experience alone will determine.

These considerations possess a definite cash value in any breeding proposition, and must be considered in the organization and development of strains of breeding

* A recessive or sport in breeding is the offspring of an animal whose characteristics, either colour makings or conformation, revert to some ancestor, male or female. This recessive characteristic may skip a number of generations before presenting itself.

stock. Experience and experiments will doubtless determine the value of the considerations outlined, and therefore every breeder of foxes should keep an accurate record of all his stock from the first start in order that the whole may be compiled for the collective benefit of the industry. Such accurate facts will ensure the confidence of the investors, and will also prove of value in pre-determining the price which can safely be paid for a male or female with certain breeding.

III.—LOCATION OF A FOX RANCH.

Many ideas prevail as to the best location of a ranch. It is, however, conceded that it should be on high, dry ground. The soil should be sandy and free from alkali if the best pelts are to be secured. Sales have shown that the most valuable pelts have been supplied from Prince Edward Island, and it is fair to assume that the climate and the soil are here eminently suited for the exploitation of the industry.

Various experienced breeders have considered it necessary to provide shade, and consequently the majority have located their ranches in a bush composed of spruce, birch, and poplar. One of the main arguments for such a location is, that foxes in the wild select a similar breeding place. It is said to be detrimental to the fur if too much sun is permitted in the ranch, thereby causing a fading of the gloss, sheen, and other fine points which are factors in judging the value of a given pelt. Observation, however, shows that both the old and young foxes differ in regard to their desire to sun themselves. Some will lie for hours in the sun, moving every time they become shaded, while others will act just the opposite. These habits will doubtless vary greatly with the different seasons, but from these considerations it would seem desirable to supply both shade and sunlight in every pen of the ranch in order that each individual fox may satisfy his own desires in this regard. It having been pre-determined what animals are to be used for pelt production, these individuals can be shaded or otherwise treated with this end in view.

It may prove of advantage to locate the ranch at the edge of a bush, so arranging the individual pens that each may have a shaded and a clear space.

A ranch should not be too close to a settlement, for various considerations. First, the foxes should be kept free from unnecessary disturbance; and second, the foxes themselves are at times quite noisy. Furthermore, a peculiar odour is given off at all times, this being more particularly noticeable during the breeding season. With a ranch near a settlement, not only would there be many visitors, but the dangers of introducing disease through the agency of stray dogs, which cannot be controlled, is greater than would be the case when isolation is a feature.

It is possible that circumstances will necessitate a certain location being decided upon, in which event every care should be exercised to make the location satisfactory from every point of view.

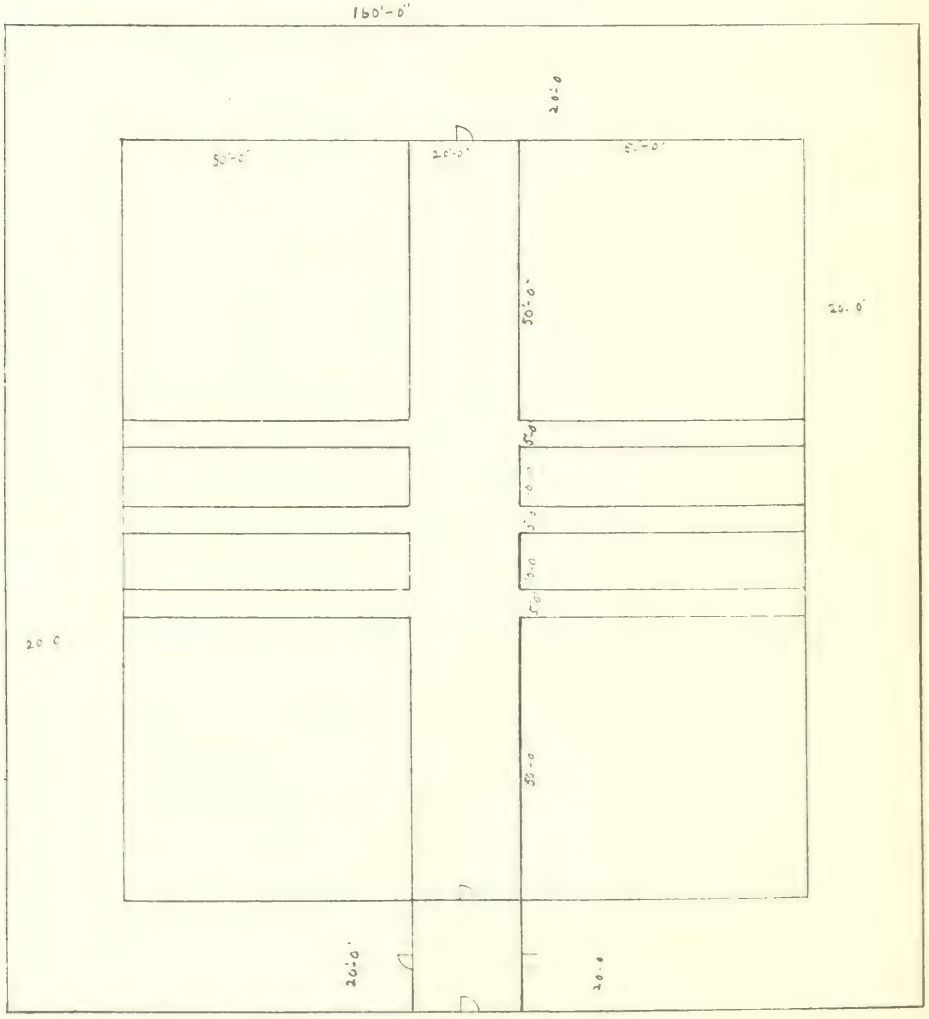
IV.—CONSTRUCTION OF A FOX RANCH.

As at present constructed, many types are to be observed. All of these various types have their strong points, yet their weak features are as apparent to the trained observer. I shall not enter into the various considerations which prevail for any given type of construction, but will outline certain features which I believe should be embodied, having a view to the maintenance of health and their protection from infectious or contagious disease. To me the maintenance of health and the protection from infectious or contagious disease are among the most important considerations affecting the fox industry to-day.

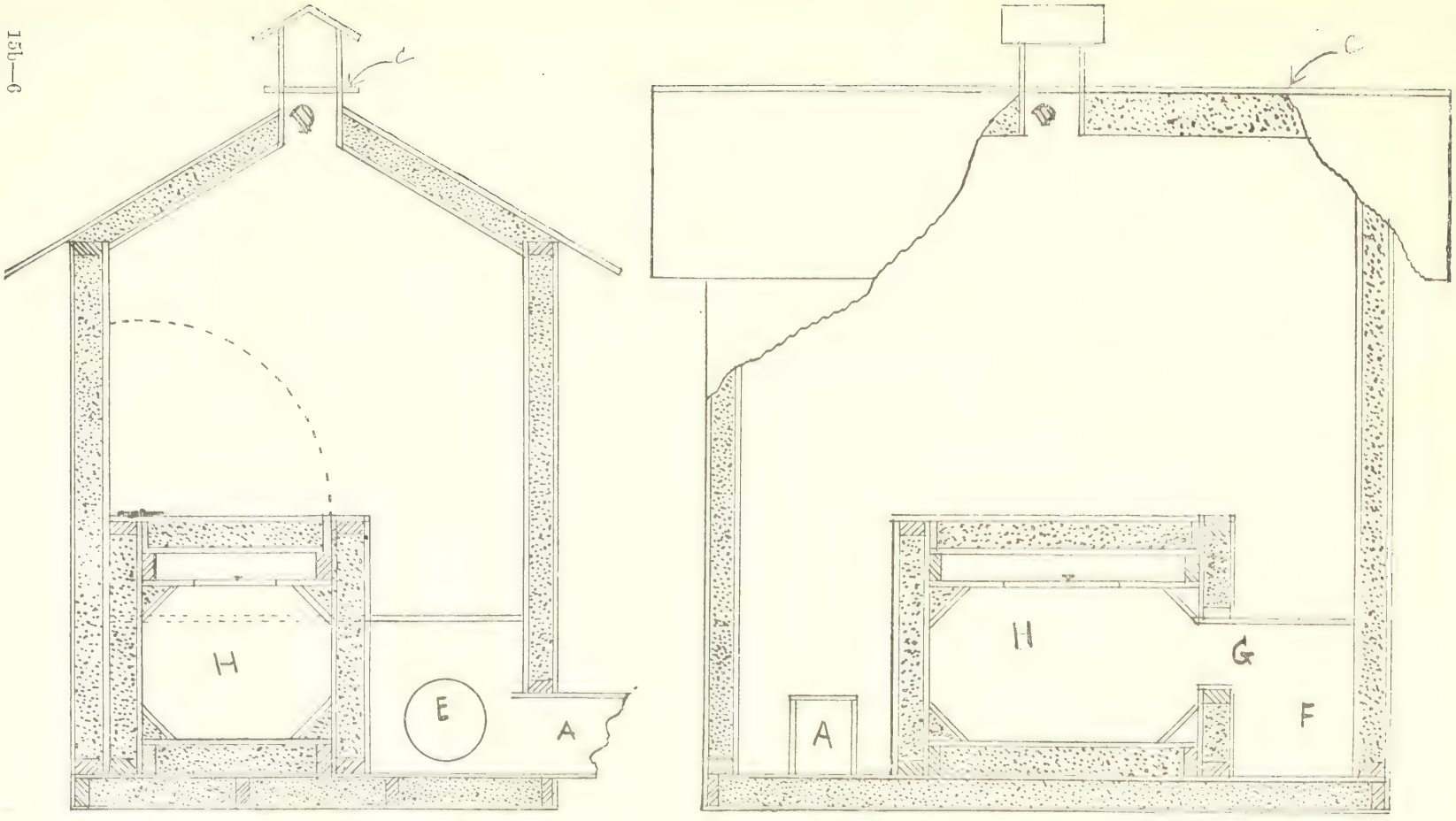
From an examination of some of the best fox ranches, and discussing the matter with the best breeders, it seems highly desirable to provide an area of approximately

2,500 square feet for each pair of foxes. Much less is observed in some of the successful ranches, while very few have a greater area.

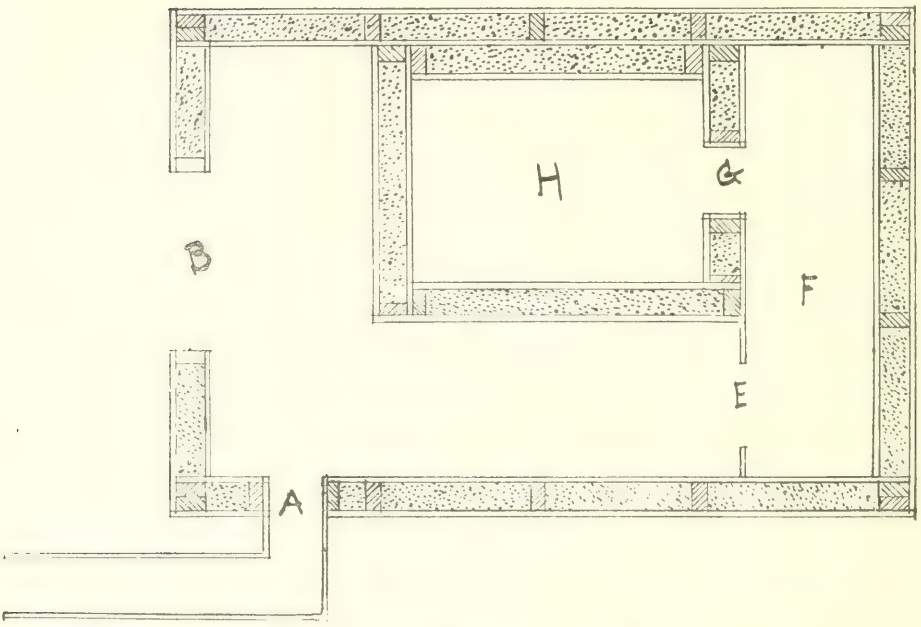
As each pair is provided with a separate pen, and it has been the general practice to so construct the ranch that the least possible area will be covered, pens are placed close to each other. This provides the accommodation within the smallest possible enclosure, yet it is apparent to me that in the event of any epizootic disease gaining entrance to the ranch this supplies the best possible means for its communication from one breeding pen to the other. Some safeguard in this respect should be provided, and this can be included in the construction of a new ranch, but cannot with such ease be incorporated in existing ranches without a great deal of difficulty, or practically the rebuilding of the whole ranch. Probably the best safeguard will be the inclusion of a dead line of not less than five feet in width between each pen, and a general construction such as is shown in the plan given hereunder.



Ground floor plan of fox ranch, showing arrangement of pens.



Cross section drawing of building containing fox den.



Floor plan of building containing fox den.

Description of Sketch No. 71

A. Chute for the entrance of the foxes to the shelter.
B. Door for entering the shelter for purposes of observation, cleaning, etc.
C. Board on the peak of the roof as a resting place for the foxes.
D. Ventilation shaft. (The chute A forms the inlet for fresh air while D is the outlet. This provides a good circulation of air without a draft on the foxes).
E. Opening for the foxes to enter the outer den.
F. Outer den. This is really a long box eighteen inches square. The top, which is removable for observation, is available for the male fox to sleep upon if so inclined.
G. Chute to inner den from the outer den.
H. Inner den. This is insulated on all sides and on the bottom with four inches of sawdust. The top is provided with a double cover for purposes of gaining access to the den for observation and cleaning.

The outside guard is usually placed from 20 to 40 feet outside the ranch, and is designed to keep away pilferers, and to withhold foxes which may accidentally escape from individual pens. It also serves as a quarantine area in the protection of the ranch as a whole.

The fences are constructed of a special fox netting manufactured for the purpose, being of the same general style but much heavier than the ordinary chicken wire netting. There is an overhang of 2 feet at the top to prevent escape by climbing up over the side, and at the bottom the wire is turned in 2 feet on the ground to prevent burrowing. This and all other fences as well are 10 feet high above ground, while the fences of the individual pens are carried down to hardpan, rock, or a cement foundation, which prevents the escape of the animals.

There is a feeling that a single male should be used on more than one female where this is possible. To this end the adjacent pens are provided with a chute through which the male may be driven after he has served one female. This is a simple matter and facilitates the easy handling of the foxes. This feature must necessarily be worked out in each instance with due regard to the form and construction of the ranch.

Many methods of working out the various details are observed in connection with the various ranches, some of which require considerable forethought. Some definite experimental work should, I believe, be undertaken in the line of ranch construction, at the same time having due regard for the peculiarities of the animal with which we are dealing, and the sanitary and other requirements which must be observed if the best results are to be secured.

I have noted that the general practice is to place the shelter containing the den within the enclosure of the vixen's breeding pen. I believe this to be sound practice, for there is no doubt in my mind that the majority of the vixen's have sufficient reasoning power and sense of location to know when they can get easily around the entire outside of this shelter. Where this shelter is placed outside of the vixen's breeding pen it is but natural to believe that some uneasiness is occasioned from this source.

V.—PROTECTION OF THE RANCH.

As has already been mentioned, a special guard fence is constructed from 20 to 40 feet outside the fox pens, and this will hold the foxes should one accidentally escape from its individual pen.

A provincial statute exists in Prince Edward Island making it a penal offence for any one to come inside the outer fence of the premises without permission. Such legislation, while very necessary, would not deter any one endeavouring to secure entrance for ulterior purposes; consequently, it is advisable to provide other protective measures. In quite a few ranches dogs are employed, but in the opinion of the various keepers their value is questionable. As there is a natural antipathy existing between the dog and the fox, which has been fostered for generations, the holding of dogs in or near a ranch for any purpose would seem to be an unwise procedure. Every effort should be exercised toward having the foxes as contented as their captive condition will permit. It might not be amiss for me to here offer the opinion that I consider it decidedly unwise to hold any animals other than foxes captive for any purpose in the immediate vicinity of any fox ranch, unless it is positively known that such an animal is the natural prey of the fox in nature. I have observed tame bears, skunks, and raccoons quartered close to breeding pens, and while no direct evidence exists that their presence had any effect upon the breeding foxes, it seems to me a bad business policy to assume an unknown risk when such a great hazard is involved.

Furthermore, on a strict sanitary basis the feeder, keeper, or manager of foxes in captivity should not come in contact with any other animals, either wild, captive, or domestic, as he would be quite likely to carry the odour on his hands and clothing, and this doubtless would exert an effect very nearly if not quite as hazardous as the presence of the animal itself. It is a fact that wild animals are possessed of instincts unknown to men, and likewise, some of their senses are of a much higher order than those of the human being. The fox is no exception, and, in common with the carnivora the sense of smell is relied upon to detect the presence of enemies and friends. It is on account of the very high development of the nose of the fox that I have laid so much stress upon the elimination of any factor which will in any manner interfere with the contentment of the fox under captive conditions.

Not only is there danger of conveying fear through the actual presence of wild animals or the transmission of their odours through some intermediate article or individual, there is also the ever present danger of transmitting epizootic disease; either of which may result in an alarming financial loss within a very short period. These considerations cannot be ignored nor overlooked by individuals interested in the fostering of the industry.

To revert to the methods of protection from the purely police point of view, where the main desire is to prevent the stealing of animals, ordinary precautions such as may be taken in other industries are resorted to. Locks of various sorts and descrip-

tions have from time immemorial provided a means of safeguarding private and public property. They likewise provide a means of detaining the curious and any but the maliciously inclined. The use of dogs for the purpose has already been commented upon, and these animals should be eliminated for sanitary and other reasons.

The use of watchmen for the patrolling of the premises is a necessity that cannot be dispensed with. A single watchman, however, does not fulfil the entire requirements demanded for perfect safety, and various devices will suggest themselves as time progresses, the result being that constant evolutionary changes will occur as the knowledge of the fox increases.

I have suggested to a number of ranchers that goats, while performing certain police duties, would also provide the best nutriment with which the young foxes could be supplied, namely, goats' milk properly modified. I do not believe that the male goat would offer a hazard, yet I know that he would successfully cope with intruders. It may be feasible to allow a few goats to roam at will outside the ranch, but within the guard fence. They would keep down the grass and underbrush, thus materially reducing the fire hazard, which in some instances is a very serious menace, and, at the same time perform a valuable police duty. Furthermore, they would, providing the proper breed is selected, give a fair revenue on the money invested.

VI.—MATING OF FOXES.

The proper mating of foxes is probably one of the most vital considerations connected with the ultimate status of the industry. Some of the breeders with the largest experience have so mated their foxes that pelts of an exceedingly high value have been secured. With those who have had less experience the mating seems to be a matter of greater or less chance.

There is no doubt in my mind but that the ranching of foxes in captivity will ultimately be placed upon a pelt-value basis, and will not remain for any extended period upon its present breeding-stock basis. The pelt value being the one upon which it must ultimately rest, demands that such steps as are necessary be taken to arrive at this point with the least possible delay. In the breeding of other animals, either wild or domestic, certain points have ever been uppermost and necessary to attain. So in the ranching of foxes for their fur, the quality and texture must necessarily be the basis upon which the business is to be continued. With this end in view, matings must be made to produce the quality and texture demanded by expert furriers who are in direct touch with the sales end of the fur business. This will doubtless vary from time to time, but until the basic factors underlying the business are determined they cannot with certainty be secured.

Probably the most effective method of arranging for the matings would be through the assistance of an expert furrier, who could at the proper season of the year examine the fur on the live animal and thus grade it according to its valuation. With this factor as a known quantity and the assistance of the accepted laws of heredity in breeding, a few years would establish the method that must be followed to arrive at a given result.

As new blood is being introduced through the mating with cross and patch foxes of local origin and the importation of foxes from other localities, factors naturally enter which cannot be ignored. Should such foxes have the texture, lustre, quality, and length of fur required, the following of nature's laws, in so far as they are known, require to be observed to their fullest extent. At the present time it would be very unwise for me to suggest that certain matings may be made with the assurance that certain positive results may be secured. Too many factors enter here, any one of which may upset the most profound calculations. Certain it is, however, that definite laws are laid down which cannot be controverted, and these laws are involved in the production of a given result. These were first outlined by Mendel. It is not my pur-

pose to enter into a detailed amplification of his views. It will suffice for me to state that Mendel found that by crossing certain varieties of plants he could secure certain results, and consequently evolved definite hypotheses which have since proved to be founded on principles which nature observes with but slight variations.

If experience should prove that some of the foxes introduced are subspecies of the same genus, then we may have excellent results from the fur-bearing viewpoint, but secure hybrid animals which nature has deprived of those reproductive powers by which the species is perpetuated. Should such an hybridizing effect follow with an improvement of the quality of the fur, then one of nature's secrets of producing a requirement of dame fashion will have been unfolded.

In the event of hybridization not occurring, then the goal ahead is the elimination of undesirable qualities and the retention in the animal of those attributes which increase the stamina and reproductive powers of the species, with the concurrent increase in the value of the fur.

The foregoing gives very briefly the more important factors which underly the actual mating process. It is in their final carrying out that the best skill and judgment will be required. As each mating will have to be determined after the careful weighing of all the considerations, no rules are to be laid down, nor can any system be evolved as a result of our present knowledge.

VII.—THE FEEDING OF ADULT FOXES.

The main purpose of food is to sustain life. In the wild, the food of the fox will be found to vary considerably from that provided under artificial conditions. The circumstances under which foxes exist in nature are very different from those obtaining in the artificial environment of the present-day fox ranch. In nature there is the constant fear of molestation, and instinct teaches the fox to bury such food as is not needed for immediate requirements. A similar instinct is observed among foxes in captivity which renders it very difficult to determine the actual amount of food required at varying intervals. In nature, forced exercise is secured in the search for food, while in captivity exercise is largely a matter of individual taste, usually the less-contented foxes securing the greater amount of exercise as a result of its constant movements in an endeavour to secure an avenue of escape. Animals which have become fairly well contented with their surroundings do not worry to such a marked extent and, therefore, do not secure sufficient exercise for their ordinary requirements. It is thus apparent that the amount of food required by each individual animal will vary within certain limits, and these limits cannot well be predetermined.

An examination of the methods in vogue at the various ranches shows that some practise almost an exclusive regimen of meat feeding, while others prefer supplementing this by bread, either ordinary stale white bread or a special bread containing a proportion of bran, crackers or soda biscuits, and milk.

From my conversations with the many breeders, it seems that the best practice is to feed early for the next season's litter, some beginning during the preceding September to build up the vitality of the stock. This appears to have a sound scientific basis, for if the vixen is not properly fed before mating, it is hardly likely that she can readily make up this deficient condition after she has become pregnant and is carrying from four to eight pups. Experience indicates that food is taken very sparingly after the new year. The period of gestation being but fifty-one days, entails a very severe strain on the animal's system, and this is a comparatively short period in which to develop a number of fully formed living animals. Nature is very profligate in its effort to perpetuate a given species, and the fox is no exception to the rule. It is known that from six to eight young in a litter are required to maintain the balance in the perpetuation of the species among the fox tribe. This is due to the chances of insufficient nourishment, the elements, natural enemies, etc. This very factor, a

prolific breeding capacity, has more than any other been responsible for the wonderful returns in the fox industry, as each individual from first-class stock possesses a value of from one to five thousand dollars.

Results indicate the desirability of full feeding from the first of September till the first of January. In this feeding the greatest care should be exercised to ensure the female receiving the required amount of food. Under natural conditions in the wild, instinct calls upon the male to feed the vixen, but in captivity it seems quite probable that a portion of this instinct is lost, with the result that the male becomes more or less greedy, reserving for himself the greater portion of the food. Being the stronger, food that he cannot eat at the time is buried for some future occasion. This being the case the female progresses toward the period when she has to bear young and is improperly nourished for the demands that will be made upon her system.

Those who have had a great deal of practical experience with these animals note a great difference in the disposition of the male with regard to food supplied the pair. With some males the main desire seems to be to see that his mate and her young are well provided with food before partaking anything himself. Instances are recorded where the male quartered in an adjacent pen will actually starve himself in his endeavour to supply his dependents with the food provided him. This instinct will doubtless be found to be very persistent, more particularly among the monogamous males (males mating with but one female) and these will require treatment as special cases. Such monogamous males make the best fathers, and will prove most contented when assisting the female in caring for the young.

Methods must be employed which will ensure the proper nourishment of the vixen. Some practise the expedient of giving the male a piece of meat and driving him away, feeding the vixen within the house and shutting the male out; or, upon occasions surfeiting the male with food which leads to a revulsion and consequent curbing of the appetite. The surfeiting of the male is the overfeeding him on a given occasion to the point of revulsion for food. After such surfeiting his appetite will be curbed in a manner similar to that of a child who had overeaten of candy or any other substance for which they have an overfondness. I make this explanation as some may consider that surfeiting means a continuous overfeeding.

Another method is to supply at all times sufficient food to meet the full demands of the vixen as well as the extraordinary demands of the male, removing such accumulations as may remain in the pen just prior to the freezing of the ground in the fall, and such subsequent accumulations periodically thereafter.

Individual experience and practice will naturally determine the factors which must be observed in the feeding of adult foxes. No definite regimen can be laid down. Variety should be a feature, as the fox is omnivorous. The trained observer who knows the vagaries of the foxes under his care should instantly be able to determine which of the animals he is feeding is gorging itself or, on the other hand, those securing insufficient nourishment.

My point may be illustrated by citing the fact that expert cattle feeders are able to note the least deviation in condition of the animals under their care, and correct this before damage has been done. This applies to cattle fed for either dairy or beef purposes.

Unless the feeder is able to observe departures from the normal, then his usefulness to that particular ranch has come to an end. While I realize the seriousness of changing hands at any season, the man who is unable to work with and for the foxes under his care is a serious hindrance to the industry, and an exceedingly expensive employee.

I believe that the feeder must have a love for his work, have a sympathy for and with the animals, be able to secure their confidence, and furthermore be strictly trustworthy. He must have a knowledge of the various digestive processes in order that he may be able to note any deranged condition, and correct such before any damage

is done. He should have a general knowledge of health and disease, both of which are desirable in the detection of any ailment. He should have such a knowledge of physiology that he can fully comprehend the changes which take place from the time of conception until the expulsion of the fully formed pups from the uterus of its mother. This knowledge, with an understanding of the composition of the food supplied by the milk of the vixen, and that which must be supplied should anything happen to her, will greatly reduce the hazards now surrounding the industry.

I cannot close the subject of feeding the adult foxes without saying a word regarding the care which should be exercised in the storage and handling of food which is designed to sustain these very valuable animals.

In some instances, not only the method of storing such food materials as are used, but the actual handling seemed to be open for a certain amount of criticism. The foxes are quartered in expensive ranches and guarded with extreme care, yet their food may be held in an inexpensive structure, easily accessible to anyone having ulterior motives. To me it would seem essential that adequate facilities be provided in this regard for the proper preservation and protection of the food supply if untoward results are to be avoided.

VIII—WHELPING.

Probably the whelping of the vixen, or the giving birth to the young, is the most serious consideration connected with the fox industry to-day. If the vixen is able to give birth to vigorous young without accident, and to properly nourish them for the first two months, the greatest dangers are passed. Any accident at this time not only reduces the anticipated profits, but unless its cause is known no remedy can be applied to prevent its recurrence. In no breeding proposition does there seem to be such mystery or fetish as to-day obtains in the fox industry. Some of this may be founded on definite facts, but it seems to me that the major portion is a direct result of superstition or lack of keen observation and experiment.

Accurate knowledge should in my opinion be the foundation stone of progress, and until this is secured very little will be known concerning the whelping and the dangers to be encountered and overcome. Progress can only come by degrees, and in all lines of endeavour is secured by intelligent observation and experiment. Observation seems to be out of the question at the present time, at least, in so far as it can be applied to the vixen at this critical period. Experiment, however, is possible, and many have been performed by various observers. I am advised on good authority that the supposition that the vixen will not under any circumstances permit an observation of the den, or her *sanctum sanctorum,* is erroneous. There are persons, keen observers, who have established such a relationship with the vixens in their care that they can open the den each day without fear of an untoward result. While I would not advise that this be undertaken in an indiscriminate manner, I believe that the feeder should be on such terms with the animals in his care that by a systematic method he will be able to learn of the exact time of whelping and know the condition of the vixen as well as that of the pups. To this end my suggestion would be that the feeder at a given time each day should examine the den and determine its exact condition. It would be far from my object to suggest that this commence only at the period when the offspring were expected, but that it should commence many months in advance of this time with a view to establishing confidence and familiarity. Having established this confidence and familiarity little danger should be anticipated at the whelping period. This, of course, must not be undertaken in an indiscriminate manner, but at the outset may be practised with a very limited number of vixens, and those most adapted for the purpose. It may be considered necessary to keep two or three pairs of red foxes for this purpose, with which the suitability of a keeper could be accurately determined.

All are familiar with the domestic cat, and no doubt many have observed that this animal in a semi-wild state has its young in a remote place, while the same animal when fully domesticated prefers either the softest bed in the house or a point of vantage behind the kitchen stove. Should the young of the semi-wild cat be found, she will immediately secure a new hiding place and remove her young to it, while the fully domesticated cat, should the young be removed to some outbuilding, makes a strenuous effort to again secure entrance to the house with her entire family. Bearing in mind the methods which may be pursued in fully domesticating the cat, experience will soon teach the best method of procedure with foxes.

Once having ascertained the suitability of a given individual by the foregoing, or any other method, his services should and will command remuneration in accordance with his skill.

I learned of a single vixen that had, under the management of a skilled attendant, given birth to and raised twenty-four pups in four seasons. In another instance, thirteen pairs produced fifty-one pups in a given season, and these animals had during the three years immediately preceding given as satisfactory results. In each instance, the management of the feeder had been skilled and such individuals are of untold value to their employers.

To those whose prejudice will not permit them to open the den of the vixen, I would suggest the placing of a small electric bulb within its confines and having attached thereto such an arrangement (a long tube or other device) that will permit an examination of its contents when the vixen is out. Probably the most satisfactory device would be on the order of what is known in medical circles as a bronchoscope, or an instrument that may, in the hands of an expert, be passed through the mouth and down the windpipe, thus enabling an examination of the interior of this passage. At its lower end is a very small electric bulb which illuminates the entire passage. With the electric bulb a similar device in the den and a sufficiently long tube, its interior could be examined at any time. This would determine the condition of the pups and point out those needing assistance, such as artificial feeding. While suggesting this plan, my experience with complicated mechanical devices leads me to believe it to be impracticable, and in no way to be compared with the daily opening up of the den by an attendant who is on familiar terms with the vixens.

The history of breeding indicates that as progress is made in the improvement of progeny of a given species, greater hazards accompany the climax of the gestation period (parturition) or the giving birth to the young. This having been the case with other species of animals, such steps as will reduce this source of loss to the minimum should be given serious thought. The suggestions I have made are radical, but they have been followed with success by some breeders and, therefore, are worthy of serious consideration.

If my suggestions are carried out, and it is found that the vixen dies during the culmination of her effort to perpetuate the species, prompt intervention may enable the saving of at least a portion of the young. Picture post cards bear mute testimony to the fact that fox pups have been reared on cats as foster mothers. Discussions with various breeders have revealed the fact, that fearing less something was amiss, the den was opened to find the vixen dead with one or more pups living. These hazards should and can be eliminated. Almost without exception those with whom I have discussed the matter are of the same opinion; many, however, are afraid to make a move so radical as I have suggested. It would seem to me that the financial status of the industry would warrant such experiments as would put the question beyond the vale of chance and in the realm of certainty, to be condemned forthwith, or introduced as sound practice. Some modifications would doubtless suggest themselves during such experimentation, and these prove adaptable to the requirements of the business.

IV. THE FEEDING OF THE PUPS.

There is probably no feature of the fox business that has led to so many losses as the improper feeding of the pups. Their food under natural conditions in the wild, other than the vixen's milk, is in a measure conjectural. The fact that the litters are large indicates that nature has provided for the survival of the fittest and expects the major portion to die ere they reach an age which will permit their breeding. In the ranching of animals it is desired to raise every pup born, and to this end every effort should be directed, it being generally admitted that the present losses are greater than they should be.

From the observations which I have made, the losses appear to be largely confined to the young pups and result from improper feeding or infestation with worms. At this time we are more directly interested in the feeding, but I will consider worm infestation in due course (see chapter XI). It is held that the feeding of the pups must begin some time prior to conception, and at this time naturally concerns the vixen. This feature was discussed when dealing with the feeding of the adult foxes (chapter VII), and needs no further mention at this time. After impregnation, the vixen undergoes that change common to the female of every species, and her temperament may assume a very different character from that observed at any other period. The greatest consideration at this time is to assist in the contentment of the vixen if the offspring are to be vigorous at parturition.

An exclusive meat diet cannot be expected to give the best results, as meat contains but a very small proportion of the bone-forming materials which at this time are very necessary. In my opinion, bones or some adequate substitute must be used if the proper chemical constituents are to be supplied. I believe that a bone mill for the cutting of green bones can with advantage be added to the equipment of a ranch. While offering this opinion, the fact should not be lost sight of that a mechanical advantage accompanies the gnawing of bones that cannot be supplied by any other means, consequently the chemistry of feeding will not entirely supersede other factors, but all must be considered and each given its proper attention.

The diet must be so balanced that the requisite substances will be included which are required for the development of the young, otherwise the vixen will draw from her own reserve in nature's effort to present living young of the highest vitality, even if this result in her ultimate death. As it is desired that the vixen nurse her offspring it is necessary to ever have this in view. The exact food and the method of feeding must be determined according to the supply which may be secured.

After the birth of the pups they need but little attention, as the vixen's milk will supply their wants. At this time, however, as well as during the gestation period, the vixen must be fed for the benefit of her offspring. For this reason the chemical constituents required by the growing pups must be contained in her milk, otherwise untoward results will follow, such as mal-nutrition which may ultimately develop into rickets, and from this into a permanent deformity of the legs. Experiment has proved that the feeding of other species of animals should commence early in the gestation period and be followed throughout along certain definite lines if the best results are to be secured. I believe that the same principles will apply to the fox industry, but, as has already been suggested, this of necessity must be intelligently supervised.

Meat, milk, fish, and eggs, supplemented with a small quantity of whole-wheat bread and ground bone should be used as the basis for the feeding of the vixen. The use of soda biscuits or other crackers has not been uniformly attended with satisfactory results. This may possibly be due to chemicals added during their manufacture, and to the fact that a most valuable constituent of the wheat has been removed in the bran.

When the pups have reached an age at which the vixen's milk must be supplemented, great care should be exercised in the nature of the food supplied to the mother,

as a portion of this will doubtless be offered to the pups. A good practice seems to be the placing of pieces of a coarse home-made bread in milk suitably modified, depending upon the vixen to carry portions of this within the den to the pups. Bran that has been permitted to soak up the blood of a beef carcass, and eggs may be used with advantage, as these supply the very necessary albuminous and proteid materials required by the fox. The adult foxes may be given meat at this time by fastening a bone, from which all of the flesh has not been removed, on an elevated platform. The adults can easily jump to this for their supply, whereas the pups have insufficient strength to do so at this time.

The pups should receive very little if any meat up to eight weeks of age, although some feed meat, fish, and shell fish as early as six weeks. Definite rules cannot be formulated with our present knowledge, but much can be done to overcome the difficulties now experienced if the foregoing suggestions are considered by an intelligent and careful feeder.

Digestive disorders will occur even under the most experienced guidance and their early recognition will avoid many losses. A deranged digestion either indicates a diseased condition arising from some outside cause or the supplying of an improper dietary regimen. The majority of these disorders will fall within the latter category.

When the digestion is deranged as the result of an improper diet, the cause must be removed immediately and the animal fasted. With this fasting a gentle purgative may prove beneficial. In resuming the diet, properly modified milk (see chapter X) to which has been added a proportion of the white or yolk of egg should be fed sparingly. Should no untoward result follow this, then the full ration may gradually be resumed, but in doing so the article responsible for the trouble should be eliminated or reduced in quantity.

X.—THE ARTIFICIAL FEEDING OF FOX PUPS.

In the artificial feeding of fox pups, I particularly refer to cases where the vixen, either through death or other accident is unable to care for her offspring. With our present knowledge, this is a very difficult proposition but must be approached cautiously with the data now in our possession.

Through the kindness of Dr. A. A. Black, of Summerside, I was provided with a very small sample of fox milk, and I am indebted to Dr. F. T. Shutt, Dominion chemist, for an analysis of this. A further study of fox milk should be undertaken as the present data can only be considered as provisional until we can supplement it with other analyses. (For such an analysis at least an ounce of milk should be available.) That the single analysis which we have may be compared with other analyses I present herewith a table giving data secured from the milk of a number of species of animals.

	Human.			Dog.	Fox.	Cat.	Rabbit.	Guinea-pig.	Sow.	Elephant.	Horse.	Ass.	Cow.	Goat.	Sheep.
	I	II	III												
Casein				5·0	3·08	3·1					1·2	0·7	3·0	3·2	5·0
Albumen		0·5		1·1		6·4					0·8	1·6	0·5	1·1	1·6
Total proteid	1·7	1·7	1·5	7·1		9·5	15·5	11·2	5·9	3·1	2·0	2·2	3·5	4·3	6·5
Fat	3·1	3·8	3·3	12·5	21·92	3·3	10·5	15·8	6·9	19·6	1·2	1·6	3·7	4·8	6·9
Sugar	5·9	6·9	6·6	3·5	0·54	4·9	2·0	1·3	3·8	8·8	5·7	6·6	4·9	4·5	4·9
Ash	0·2	0·2	0·3	1·3		0·6	2·6	0·6	1·1	0·7	0·4	0·5	0·7	0·8	0·9

From this table it will be observed that the fat content in fox milk is extremely high, and I may here mention that the proteid could not be determined in the sample

at hand, while the casein and albumen could not be estimated separately. Basing my suggestions upon the analysis as given, and assuming the proteid content to be in the neighbourhood of eight per cent, or somewhere between that of the dog and the cat, a formula for the modification of goat's or cow's milk would be as follows:—

Formula for Modified Milk.

	Ounces.
Fresh unsalted butter	1½
Proteid (supplied by the use of clear beef broth free from fat or sediment)	1
Goats milk—whole	2
(In lieu of goat's milk, 1¾ ounces of whole cow's milk may be used).	
Lime-water and barley-water in equal proportions, sufficient to make a total of	8

This may be fed to the pups, either with a spoon or through a nursing bottle, some of which are specially made for use with pups. For very young pups, one-half an ounce should be sufficient every three hours. Should this formula not be well tolerated, reduce its strength by increasing the amount of barley-water, making the whole up to 10 ounces. As the pup increases in size and weight, reduce both the lime- and barley-waters, and in lieu of the reduction add its equivalent in egg, beating the white and the yolk together before adding. The quantity of this modification will naturally have to be increased with the growth of the pups. The gradual increase in its strength, while reducing its liquid bulk, gives the added nourishment required without unduly distending the stomach of the small animal.

When the pups are able to lap this up, other constituents such as coarse home-made bread prepared with bran, cornmeal, milk, and beef drippings may be added, sparingly at first and gradually increasing the amount, carefully watching for any untoward result. As the fox pup becomes stronger both the lime-water and barley-water may be eliminated and the diet supplemented by eggs and later by meat and other materials such as are used for the adults.

Indigestion, manifested either by constipation or diarrhœa must be noted and the formula varied to overcome either condition. When constipation is noted this can doubtless be corrected by slightly increasing the amount of whole milk added. With diarrhœa the increasing of the lime-water and barley water will doubtless be followed by the desired result.

It will be noted that I have given preference to goat's milk, and my reason for this is the more easy assimilation of the fat of this milk and the butter-fat in the presence of the curd of goat's milk. If cow's milk must be used it should not be from Jersey's or Guernsey's, as the milk of either breed, owing to the large size of the fat globules, forms a solid curd upon coming into contact with the acid of the stomach, and thus the digestive processes are retarded. When goat's milk coagulates in the stomach, a fine granular curd is produced which permits the digestive juices to attack it and successfully prepare it for assimilation. The milk of the Holstein and that of grade cattle have proven to be the best suited for infant feeding, next to that of the goat, and consequently it is assumed that a similar advantage will prove the rule when feeding young foxes.

It may appear that the butter-fat will exert an untoward effect, but from the fact that its natural milk has been removed I believe that but very little trouble will be experienced from this source.

At the outset, artificial feeding will present its difficulties, but a little practice and experience will indicate the pitfalls and ultimately lead to their elimination. I cannot in this very brief résumé give full details to cover the many variations that will be required in actual practice, but believe that the suggestions offered, if intelligently followed, will prevent losses that would otherwise occur.

XI.—THE DISEASES OF THE FOX.

It is not my purpose to enter into a detailed discussion of the diseases of the fox, nor do I intend to dwell upon the methods of combating specific disorders or infections. Such details must be dealt with by individuals specially trained in the diagnosis and treatment of disease who are conversant with the action and uses of drugs. From what I have been able to gather, the fox is subject to disorders peculiar to his species, and also possesses a certain susceptibility to drugs not observed in other varieties of animals. There is more to be learned in this connection, and naturally those veterinarians most intimately associated with the industry are best able to offer advice and deal with disorders at first hand. As our knowledge of their pathology increases as applied to the fox, then the advice which may be given will be of a more exact nature than is at present possible.

I have already pointed out some features worthy of more than passing interest, from the sanitary viewpoint, when dealing with the construction and protection of the ranch (chapters IV and V). As these considerations have been included as a means of preventing disease, it will be timely for me to mention some of the infectious diseases that have already occurred which will prove a constant menace to the success of the industry.

Internal Parasites.—By internal parasites I particularly refer to such as may occur in the intestines, securing the nutriment for their existence from the food that has been prepared by the digestive functions for the nourishment of its host. Probably the most serious infectious process at present confronting the industry is caused by the *Ascaris mystax,* a round worm peculiar to the fox, infesting the stomach and intestines. It has been my privilege to autopsy two fox pups twenty-six days old, and in each case death resulted from infestation with this parasite. The only means of combatting such an infection is to eliminate it before the pups are born, for to have a worm infestation in the pups we must have worms in the adults, the vixen or the male. The worms maturing within the body of the adult lay their eggs within the intestinal contents, pass out with the excreta, contaminate the mammæ or teats of the vixen, to be taken into the stomach of the new-born pup with his first nourishment. These worms may attain a length of from one and a half to eight inches. The treatment of little pups is a very hazardous procedure, and may be as disastrous as the parasite it is desired to combat. Treatment, however, is indicated even in the small pups, but with such valuable animals as the silver black foxes, I believe that an examination should be made of the excreta of each adult in September, and if the eggs of this parasite are present, adequate treatment should be undertaken for their elimination, and reinfection prevented. This means some expense, but by the saving of a single pup it would prove an economical investment.

Not only may this worm be present, but there may also be any one of a number of varieties of similar parasites. The *Ascaris mystax* is mentioned as it is the most commonly met with. Some of the others are more difficult to combat, yet all may be eliminated providing the proper measures are followed under trained supervision.

Tapeworms have been found in Canadian foxes, and have caused the death of a number of animals. Of the tapeworms infesting the fox there are nine varieties which have been described. Each of these nine has its own characteristic life-history and a host from which the fox may become infested. A tapeworm is found as such in the intestine of its host, in this instance it is the fox, where it grows by absorbing the partially digested food contained therein. The tapeworm is always provided with suckers, and in some instances with small hooklets for attaching itself in the most favourable portion of the intestine or where the food supply is most suitable. After attaining a certain development the mature segments are fertilized, break away from the head portion and pass out with the excreta. Upon being voided by the animal the eggs contained in the segment are liberated, and if moistened for a few days become

fully developed, from each of which emerge a small water parasite. This small water parasite disports itself until ready for its new host, a species of water snail, making directly for its liver, and there securing itself. A certain further development takes place in this liver tissue and when completed the snail crawls up a blade of grass to sun itself. The parasite now emerges, attaches itself to the grass and forms a protective covering of lime about itself. Here it awaits a new host which in one instance is the rabbit. The rabbit eats the grass, the lime covering is dissolved from the parasite in the stomach and the parasite burrows through the tissues of its new host until it finds a suitable resting place, where, at the expense of this host it envelopes itself in a watery bag to await the arrival of a fox to devour the rabbit and thus gain entrance to the intestine, where havoc is again wrought. This, then, is a hurried sketch of the various stages of development which this parasite must undergo.

With a knowledge of the means by which the above types of parasites develop and infest the foxes, we are prepared to undertake such precautions as will prevent their causing trouble and financial loss to the industry.

Not only are there intestinal parasites which invade the fox, but a fluke which invades the liver has also been found. How dangerous this may prove is at present an unknown factor which future investigation alone can reveal.

External Parasites.—There are parasites which inhabit the external portions of the body, such as lice and fleas, but the most serious is the mange parasite which burrows into the skin. Mange has occurred among foxes, and great care should be exercised in preventing its introduction. Its treatment has presented extreme difficulties, and in many instances is of little avail. As the fox is so different from other animals its treatment must be undertaken by skilled direction.

Febrile Infectious Diseases.—Under this heading will be classed those disorders which are manifested by a rise in the body temperature. There is no doubt but that the fox is susceptible to many disorders of an infectious nature accompanied by fever. Their classification, however, at the present time is out of the question, and I will consider only distemper.

Distemper, similar to that occurring among dogs and cats, has occurred among foxes and is an ever-present menace. With distemper, as with the other disorders of an infectious nature, skilled treatment based upon the symptoms presented must be at hand, and each case dealt with as it occurs. My view here is, that this, as well as all of the other infectious diseases, are best dealt with before they gain access to the ranch. Once they have occurred, each instance must receive individual treatment, as so many variations from the classical type are observed.

Non-Febrile Infectious Diseases.—Very few non-febrile infectious diseases are observed in the fox, other than the parasitic infestations which have already been dealt with, One infection, rabies or hydrophobia, is common to all known animals and to man. On account of the danger of infecting man from the bite of a rabid animal, it is highly desirable that it should be here recorded as an affection which may infect the fox.

Rabies is an infection that can be passed only by the bite of a rabid animal. How much danger there is of this becoming epizootic among captive foxes is unknown, but to be transmitted one fox must be bitten by some rabid animal or a rabid fox, hence the ranch construction should be such as to provide against this contingency should a case unfortunately occur. History records that the Duke of Richmond died near Ottawa of rabies contracted from the bite of a pet fox. I have unsuccessfully endeavoured to secure information regarding the fox in question. At that time rabies was not known to be present among other animals in the locality. We have, however, the report of a case of rabies in man at Victoria, B.C., contracted in the Yukon from the bite of a tame wolf. In the Southwestern States the disease has been reported to be conveyed by skunks to men sleeping in the open.

Such data must be considered in its bearing on the industry surrounding captive foxes, and given its proper weight when dealing with protective problems.

General Considerations in the Prevention of Infectious Diseases.—It has been my effort throughout in the preparation of this report, to point out some of the underlying principles which will prevent the introduction of infectious disease, rather than to enter the field of dealing with the treatment by drugs or otherwise, of every disorder to which the fox is heir. Such descriptions, to my mind, would only increase the uncertainty concerning the disorder or the method of treatment which should be adopted.

For these reasons I have considered it wise to give a great deal of attention to the location, construction, and protection of the ranch. The dead lines will effectively prevent the spread of infectious disease from pen to pen unless the infection is carried by the keeper. I have personally observed keepers passing from a pen in which worms had been found in the deposited excreta, directly to another pen without giving any attention to the cleansing of his boots, which would carry thousands of eggs. This seems to me to be an unwarranted chance where such valuable animals are concerned and, as had already been stated, such verminous infestation should be eliminated from the adult and the ranch. The value of the animals warrants this step being taken. A simple inexpensive precaution is that of having extra rubbers for the keeper, as these can easily be cleansed and disinfected.

On account of the dangers which may attend the promiscuous visiting of ranches by curious strangers, I believe that it would prove a wise precaution to permit them to view the foxes from a point of vantage that will eliminate the danger of introducing infection. If necessary, it would, in my opinion, be an economical procedure to build a suitable observation walk that could be sprinkled with a suitable disinfectant. Visitors introduce a hazardous factor which should be provided for to the fullest extent.

Malignant Growths, Tumours, Cancer.—Such growths have been found in a number of foxes examined at the laboratory under my charge. At the moment I cannot suggest the significance which should be placed on their occurrence, or the danger that may be anticipated. The subject of cancer has, within the past few years, received a great deal of attention from various investigators. The most recent work seems to indicate that diet may play an important part in its occurrence. In a number of experiments it has been shown that the experimental cancer has failed to grow when the series of animals was given a restricted diet, while another series allowed a liberal dietary was severely affected. It has not been possible to secure full details of the cases among foxes coming to our notice in routine laboratory work. I merely mention their existence to indicate a possible danger from this source which will naturally increase with the domestication of the fox.

XII.—TREATMENT OF DISEASES.

I have already pointed out that disorders should be dealt with by some person (preferably a veterinarian) skilled in the diagnosis of disease among animals, and in the use of drugs. With foxes, as with other animals and the human being, proprietary remedies should be regarded with suspicion as they are liable, in inexperienced hands, to do more harm than good. The manufacturers of specifics are anxious to sell their goods, and it is but natural that they should consider their particular formulæ specifics for the disorders described in their literature and booklets.

In my opinion drugs should only be used when the symptoms indicate the necessity, and then only under skilled direction. In diseased conditions we know of but few specifics, and these are of such a powerful nature that the greatest care must be exercised in their administration.

All disorders should be treated from the symptomatic standpoint after a correct diagnosis, and never given a drug on a chance shot, save in extreme cases.

SESSIONAL PAPER No. 15b

(Supplement No. II to Report of Pathologist.)

IS *LEUCOCYTOZOON ANATIS* THE CAUSE OF A NEW DISEASE IN DUCKS.

By A. B. Wickware, Assistant Pathologist, Health of Animals—Biological Laboratory, Ottawa, Canada.

(With Plates I—III.)

During the past summer numerous inquiries were received by Professor Elford, Dominion Poultry Husbandman, Experimental Farm, Ottawa, with regard to an apparently infectious disease appearing among ducks. So frequent and insistent were the appeals for aid in this connection that the co-operation of the Health of Animals Branch was requested. This resulted in an investigation being undertaken to ascertain the clinical nature of the disease; to demonstrate, if possible, the cause; and also institute measures for its prevention.

As a serious outbreak had occurred on a poultry farm in the vicinity of Ottawa, Ont., which threatened to jeopardize the existence of the plant, this place was chosen as a favourable location for commencing studies.

On arrival at the poultry farm in question, it was learned that the young ducks had been dying on an average of twenty a day. The losses would continue thus for a few days, after which there appeared to be a remission for about a ten-day period, with a recurrence at the expiration of this time when the fatalities would again be enormous.

Symptoms of the Disease.—The affection runs a rapid and fatal course with very slight prodromal symptoms to indicate its onset. The first clinical feature observed is an impaired appetite. This reluctance to take the ordinary amount of food is particularly noticeable in ducks having access to swimming pools. These birds prefer to remain in the cool water undisturbed, evincing no response to the call for feeding, and this fact is indeed significant.

The attitude of affected individuals varies considerably, depending upon the course of the disease. In some instances, ducks succumb during the first severe paroxysm, while in others exacerbations occur at intermittent periods without producing a fatal result. Affected ducks will lie in a semi-comatose condition with the neck bent backwards and the head resting upon the dorsal portion of the spinal column. When roused this condition of stupor gives way to a period of intense excitement, during which a series of remarkable evolutions are indulged in. The head occupies various positions, sometimes describing circles in the air, and at other periods, oscillating to and fro. In others the neck is completely turned upon itself with the head resting upon the ground in an upright position, as shown in plate I, figs. 1 and 2.

The power of equilibrium is also lost, the duck turning over backwards until completely exhausted. In the majority of recovered birds, there also appears to be some difficulty in locomotion, a decided lameness being present in one or other of the legs, usually the left one. Another manifestation which is fairly constant, is a purulent ophthalmia, the eyes being completely closed with the lids adherent to each other.

The mortality is exceptionally high, probably aggregating to 65 to 70 per cent, while the ducks which recover remain undersized and stunted, (plate I, fig. 3).

Etiology.—The causative agent is, as yet, undertermined, owing partly to the limited nature of our investigations. When first observed, the manifest cerebral disturbance was attributed by some poultrymen to the development of insect larvæ in

the nasal chambers through the deposition of eggs by a species of blue fly. In a few cases larvæ were found in the frontal sinuses, but only in those instances in which the affection was running a subacute course, the eggs probably being deposited after the duck was semi-comatose or moribund. In autopsies where the disease ran an acute course, larvæ were never found.

Microscopic examinations of the cerebro-spinal fluid, peritoneal exudates, etc., failed to reveal any organisms to which a pathogenic rôle could be ascribed, but as laboratory facilities were lacking at the time, cultural methods could not then be adopted, thus nullifying any general conclusion which might be drawn.

An examination of the blood revealed a *Leucocytozoon* which was present in large numbers in the peripheral circulation of the affected ducks.

Leucocytozoon anatis.—This parasite, to which so far as we are aware, no previous reference has been made, was observed during the course of the investigations. Subsequently, identical parasites were demonstrated in the blood of ducks similarly affected on the Experimental Farm, Ottawa. In view of the fact that no record of this parasite can be found, we are naming it *Leucocytozoon anatis.*

The parasites were present in large numbers in the peripheral circulation of ducks in which the affection ran an acute and fatal course. Smears from the spleen also showed an abundance of parasites. These protozoa gradually diminished in number in the ducks which made an apparent recovery, while in contact birds which presented no clinical manifestations, parasites were not demonstrable. Examination of the blood of other contact fowls as well as ducks from sources where the disease was not prevalent, failed to reveal any hematozoa.

Morphology.—The shape of the parasites is fairly uniform, although there appears to be considerable pleomorphism in the gamete forms. The predominant type is a spindle-shaped organism 35μ to 60μ in length by 10μ in width, showing an oval, elongated or irregularly shaped nucleus, with dark chromatic band extending along one border. The nucleus stains, with Giemsa, a dark blue having a granular appearance. In the centre may be observed a small chromatin staining body varying slightly in shape. The cytoplasm appears almost transparent or at most stains a faint pink and terminates at each end in an acute angle. Although, as previously mentioned, there is marked uniformity in shape, it might be advisable to state that considerable variation occurs in the staining characteristics of the mature forms. The chromatic band is similar in all instances, but in certain adult forms the nucleus stains indistinctly a light blue with radiating filaments of chromatin throughout.

Examined in fresh blood preparations, the parasite appears to be non-motile, but as it has recently been shown at Khartoum that motility is present in some of the larger forms, further studies must be undertaken before making a positive statement in this respect.

Pathological Anatomy.—Microscopically the visceral organs fail to show an abnormality excepting an acute hæmorrhagic inflammation of the large intestine immediately behind the cæca. The normal body fluids appear unaltered, while scrapings from the intestinal wall and examinations of the bowel content show an absence of coccidia or other parasites. In some of the ducks examined, the mouth and pharynx contained a considerable quantity of blood and mucus, the former probably being due to traumatic injuries sustained through the head coming in violent contact with the ground during the paroxysms.

The blood in all cases of infection showed an increase of eosinophiles, and the presence of *Leucocytozoon anatis.*

Transmission Experiments.—Our investigations along this line were necessarily limited, as experiments were conducted at the laboratory and all the affected ducks died excepting one survivor which was the only source from which material was available.

Young ducks, three weeks old, were inoculated intraperitoneally with blood taken directly from the affected individual, and placed in a colony house free from infection. Control ducks from the same source were employed. A systematic examination of the peripheral circulation of these experimental ducks for some days previous to inoculation, together with the controls, was conducted. These resulted negatively in every instance, no variation from the normal being observed. Subsequent to inoculation, these examinations were continued daily and on the seventh day two gamete forms were noted in the blood of one of the artificially infected ducks. The controls appeared normal. These earliest forms appeared as organisms showing a transparent cytoplasm containing a few basophilic granules, with a band of chromatin at one side but possessing no nucleus. Three days afterwards, the typical gamete forms appeared showing the dark blue nucleus. These forms persisted for a few days and then suddenly disappeared. No mature forms were present in the smears examined at any time during the period of observation. White rats were also inoculated, but these proved refractory to infection.

Conclusions.—No general conclusions can be drawn until further experimental studies are undertaken, but a few salient features may be briefly summarized in closing. That the *Leucocytozoon* above described is the causative agent of this disease, we are not prepared to say. The fact, however, that this parasite was present in large numbers in all affected birds and absent in all the controls coming under our observation, is rather significant. Another peculiar feature is the disappearance of the mature forms from the blood stream of the affected duck in our possession which seemed to coincide with the period of recovery.

The reason for our failure to transmit the disease may possibly be attributable to (1) The attenuated virulence of the parasite owing to the fact that the disease in this instance was running a chronic course and the duck was progressing towards recovery. (2) The fact that the disease appears to be prevalent only in the hot months of the year, as no fresh outbreaks have occurred at any of the plants under observation. (3) The fact that gamete forms appeared in one of the experimental ducks and then disappeared, might be taken to indicate that the disease, in an acute form, is not directly transmissible, the parasite undergoing an exogenous life-cycle dependent for its propagation upon some intermediate host, possibly an insect.

Providing opportunity presents itself, we intend undertaking a more methodical research into the etiology, prophylaxis and treatment of this affection.

I wish to express my indebtedness to Dr. F. Torrance, Veterinary Director General for permission to publish this preliminary report, also for facilities afforded me at the laboratory and the hearty co-operation of the officials of the Poultry Department.

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(Supplement No. III to Report of the Pathologist.)

AN ECONOMICAL MEASURING DEVICE.

(CHAS. H. HIGGINS, *Pathologist.*)

Through force of circumstances we are many times obliged to devise pieces of apparatus, for the performance of certain routine work in a laboratory, which are not provided for in the usual catalogues. Being confronted with the necessity of filling something over a hundred thousand ampoules per year, and having investigated the various types of ampoule fillers, including automatic burettes, vacuum devices, etc., I was not satisfied that any of these would meet the peculiar requirements of our work. Some of the more expensive of these were tried and found wanting, either in speed, defective mechanical construction, or accuracy. Furthermore, the majority were costly and required constant repairing.

We are all familiar with the old-fashioned burettes fitted with a two-way cock for filling and emptying, and to those who have worked with these I need not mention the strain caused in the muscles of the back and of the neck for they are so realistic as to need no description.

In the search for something better, many devices were experimented with, the principal factors being that to be satisfactory such an one must be comparatively cheap, easy of sterilization, accurate in measuring, permit no waste, and at the same time leave both hands free to enable the rapid sealing of the ampoules in the flame, and their labelling, at the one operation. No device available would meet these requirements. Needless to say the first experiments were not reassuring, for the requirements were very exacting as it was desired to attain the maximum speed, and, in so far as it was possible, to eliminate the personal factor in such work.

The results secured have been very gratifying and the photograph (plate I) shows a device made from material, the more expensive parts of which would have been thrown into the waste bucket as of no further use had they not been utilized for the purpose herein shown.

The requisites for this device are: an old ground glass barrel syringe (this may be one that has outlived its service for hypodermic work through being broken at the lower part to which the needle is applied), a three-way cock, some pure gum rubber tubing (preferably what is termed as heavy pressure tubing), a ring stand, clamps, etc., and a device with a thread which will permit of the guaging of the dose to be delivered. With these, a few weights, some twine, wire, or a fine chain, and a stick for a foot lever we have all that is required save a little ingenuity, which all laboratory workers should possess, to put the apparatus together.

The principle on which the apparatus works is that the three-way cock permits the liquid to run by gravity from a elevated source of supply into the adjusted hypodermic syringe, the syringe fills to the point determined, when a quarter turn of the cock allows the dose to discharge through the canula into the ampoule. The turning of the three-way cock for filling the ampoule is caused by pressure on the foot lever, and when this lever is released a counterpoise weight raises it, permitting the liquid to again fill the measuring device.

With this apparatus, both hands are free as has already been explained, the accuracy is assured, thus eliminating the personal element which is the most frequent source of error with all measuring devices. Its application is wide, as it may be used not only for the measuring of various biological products, but also for concentrated chemicals, such as carbolic acid when it is desired to make up a solution of a certain

standard strength for any routine purpose, liquid culture media, or in fact any purpose which requires the repeated delivery of a given amount of any free-flowing liquid.

We have had two of these machines in constant use for the past three years, and while the experience gained has enabled their perfection and simplification, they stand essentially as when first set up. Circumstances have indicated the desirability of having such a machine constructed on a separate stand which may be moved from place to place as requirements may dictate, and one of these is now available (plate II) and is giving perfect satisfaction.

In the filling of ampoules it has been found possible for a novice to take up the work, and, if at all adept with the fingers, is able to fill, seal and label three hundred ampoules per hour. The great advantage is that once the ampoule is taken up in the fingers it is not laid down till all of the operations have been completed, and in this way a great saving in time is the result. The machine itself works rapidly, and it is never necessary (providing the proper adjustment has been made), to wait for the machine itself to complete its portion of the operation. The device being worked by a foot lever leaves both hands free for the various manipulations that are required.

For any purpose that necessitates the accurate delivery of a given amount of liquid I have yet failed to find any apparatus that will give equal satisfaction to the machine here described and shown in the photographs, providing there is a large amount of work to be accomplished. Where less than twenty-five individual measurements are to be made, this machine would not lend itself to practical requirements. But where there are from a few hundred to hundreds of thousands of packages to be put out, this device is in my opinion better than any which I have seen in use or figured in the various supply house catalogues. Further, it is cheap and may readily be constructed with material available even in the most remote localities.

APPENDIX No. 14.

(E. A. WATSON, *Pathologist in Charge.*)

VETERINARY RESEARCH LABORATORY, LETHBRIDGE, ALTA.,

March 31, 1915.

SIR,—I have the honour to submit herewith my report for the year ending March 31, 1915.

The main work of the laboratory has been in connection with dourine, in examining all the animals involved in different outbreaks, by serum methods of diagnosis, and in which the application of the complement fixation test has proved to be of the utmost value.

I firmly believe that this test can be trusted to indicate 100 per cent of the cases of dourine infection, provided, of course, that the conditions laid down are fully observed, and that by applying the test to the widest possible extent, wherever the disease may be thought to exist, dourine will cease to be a menace to horse-breeding. The problem, however, of dealing with the disease and making the best possible use of the test method of diagnosis is a serious one on the large ranches and Indian reservations, where thousands of horses are involved and where there is intermingling of different herds. The difficulties in the way of rounding up all the animals for a test, stopping the intermingling of stray herds or alien animals wandering on to a restricted area, and the enforcement of strict regulations during and between the test periods are great, but Dr. Hargrave, Chief Inspector for Alberta, is striving to overcome them and to see that the conditions necessary for a successful eradication test are complied with.

The following figures in connection with the complement fixation test for dourine show the extent of the application of the method of diagnosis and the amount of work performed at this laboratory in this respect for the year ending March 31, 1915:—

Suspected serum giving negative reactions	6,194
" " " positive reactions	417
" " unsatisfactory reactions	77
Bad specimens, unfit for test	26
Total number of specimens received for test	6,714

For the previous year, ending March 31, 1914, 4,015 serum tests for dourine were made at this laboratory, 512 suspected sera giving positive dourine reactions.

In all this work we have employed a large number of control tests, using for this purpose our experimental dourine horses as well as several naturally infected horses that have been sent to this station. At the same time we have been continuously making experiments and observations in respect to the length of time after infection when the serum first gives a positive reaction, and following the reaction by repeated tests throughout the course of the disease and in those cases that have fully recovered from the disease. The results have been very interesting and very satisfactory in respect to the reliability and value of the test.

Our test records show that, diagnostic and experimental retests together, we have made over 15,000 tests during the past two years, not including the large numbers of preliminary tests and titrations and experimental tests of lesser importance that remain unrecorded.

For the collection of blood samples all the vials and apparatus required are prepared and sterilized in the laboratory and distributed at different points as needed.

This in itself adds appreciably to the work of the laboratory staff. The office work has also much increased and takes up a great deal of my time that I would sooner spend in veterinary research.

In addition to our work on dourine we have made a fairly extensive investigation of swamp fever of horses, especially in regard to special properties of the blood and serum in this disease. A number of horses have been experimentally infected and died from the disease, experiments being carried on throughout the year. The work is still incomplete in several aspects, but I hope to have a report ready for publication in a few months.

We have also made complement fixation diagnoses in connection with glanders, and have made numerous examinations and test inoculations of suspected material and specimens from different diseases, among which may be mentioned anthrax, black-leg, malignant œdema, contagious abortion, carcinoma, etc.

In July last I was given the privilege of accompanying you to England to attend the International Veterinary Congress. Most unfortunately, the European war broke out just before the opening meeting, and the congress was abandoned before anything had been accomplished. I was able to visit some of the laboratories in England, however, before returning to Canada.

I have to express my highest appreciation and thanks for your interest and encouragement in our laboratory work. Also, to make sincere acknowledgment of the able assistance given by my co-workers.

Dr. W. L. Hawke was here for the first half of the year, and Dr. A. E. Cameron since May last. Both became expert in serological technique and methods of precision, and though the work has been extremely arduous, often taking us far into night or early morning hours, no complaint has been heard nor any strain put upon our friendly and helpful association.

Dr. H. Wehrbein was temporarily engaged in the laboratory, and did good work while here. Mr. Lewis, who looks after the stables, animals in pasture, does all the teaming required, and has multifarious duties to perform, is a steady and painstaking worker.

I have prepared for publication a full account of our complement fixation method of diagnosis in dourine, a copy of which I submit herewith as an appendix to this report.

I have the honour to be, sir,
Your obedient servant,

A. WATSON,
Pathologist.

To the Veterinary Director General,
Ottawa.

(*Supplement to Report of E. A. Watson, Pathologist in charge, Veterinary Research Laboratory, Lethbridge, Alberta.*)

DOURINE AND THE COMPLEMENT FIXATION TEST.

INTRODUCTION.

This paper is written with the purpose of drawing further attention to the value of the complement fixation reaction as a diagnostic test in dourine and of recommending a method of procedure and technique arrived at with an experience of 15,000 tests for dourine made at the Veterinary Research Laboratory, Lethbridge.

In a previous paper I have briefly described the serum reactions in dourine. Since that paper was published in 1912 (*Proceedings of the American Veterinary-Medical Association*) diagnostic tests for dourine have been carried along continuously at this laboratory, together with exhaustive control and experimental tests and the searching out of every possible source of error. By the numbers of horses available for experiment, the prolonged trial of the test through every known phase of the disease and its widest application in naturally occurring outbreaks, coupled with observations in company with the veterinary officers in charge of the field work, the complement fixation reaction has been thoroughly established as a sure, safe and specific method of diagnosing dourine. The experience shows that the test meets every requirement with regard to specificity, uniformity and decisiveness. It has been adopted as the official test for dourine in this country by Dr. F. Torrance, Veterinary Director General for Canada, who kindly permits me to publish this paper.

By the complement fixation test it has been possible—and without difficulty—not only to make a certain diagnosis of the more or less symptomatic cases, but, and of greater importance, to positively determine the existence of the non-clinical, obscure and latent forms of infection.

Only by a systematic application of the test to every animal exposed to infection —and in no other way known at present—can the healthy-looking, so-called immune carriers of dourine be detected. When it is remembered that horses may tolerate a dourine infection for periods of one to three years and remain for that time normal in general health and appearance but capable at times of transmitting the disease, the necessity of an early and definite diagnosis is evident. The complement fixation test furnishes this and thus becomes of great importance as a basis for the control and suppression of dourine. It is being applied in every known outbreak of dourine in Canada, and, as a precautionary measure, in the various studs and to stallions standing for service in the districts that have come to be considered as dourine-infected areas.

BRIEF EXPLANATION.

The general principles and mechanism of the complement fixation reaction are now so widely known that it seems unnecessary for the purposes of this paper to repeat them in detail, a few remarks on the subject sufficing to make it clear and intelligible.

When an antigen is introduced into an animal either by way of natural infection or by artificial administration a group of reaction products arise in the animal's serum—known as antibodies—bearing a specific relationship to the antigen and able to combine with it outside of the animal body under certain conditions. Micro-organisms, foreign blood cells and sera, albumens and many forms of protein matter are able to act as antigens. Thus an animal infected with dourine produces antibodies resulting from and specifically related to the dourine antigen, namely *Trypanosoma equiperdum,* the actual cause of the disease.

In a similar manner, an animal which has received injections of the blood of another animal species becomes possessed of antibodies having a specific affinity for the blood of that particular species of animal. In other words, the antibody arising in response to the exciting antigen in the process of infection, sensitization, or immunization, has the specific function of acting upon that antigen to neutralize it or prepare it for destruction.

The complement fixation test applied in the diagnosis of disease consists of two sets of an antigen and antibody, that is, two distinct and separable combining groups having no relationship to one another, but in each of which *Complement*—a constituent of normal serum—is an essential factor. It is convenient to distinguish these groups by referring to the one comprising haemolytic serum, red cells and complement

as the "hæmolytic system" and to the other—closely related to the disease—comprising dourine antibody, corresponding antigen, and complement as the "antibody-combining group." Thus:

Dourine or antibody combining group	Hæmolytic serum	*Hæmolytic system*
	Red cells	
	—COMPLEMENT—	
	Antigen	
	Antibody	

Before the test can actually be applied the exact dosage of the different elements in each group must be worked out by careful quantitative titrations—the most important step in the whole proceeding—and the operator must be absolutely assured that each group reaction is under his perfect control and that the least disturbing factor will be known to him. In the actual test only one complement unit is employed (the minimal amount necessary for the completion of the hæmolytic system) so that only one of the reaction groups can come into operation; it is according to whether the complement unit is attracted and affixed to the antibody-combining group or to the hæmolytic group that we obtain a positive or a negative reaction. The former will always be affected when the antigen and antibody correspond, that is, when the serum tested contains the specific reaction products of dourine infection even though in minutest quantity, so delicate is the reaction. Neither the antigen alone nor the serum alone, when properly prepared, can take up the complement unit; to do so, all three factors must be brought into intimate contact, and when the test serum does not contain specific dourine antibodies the complement is not fixed to this group but remains free to join with and complete the two factors of the hæmolytic system, so that the red cells undergo hæmolysis and a negative reaction is indicated.

TECHNIQUE AND PROCEDURE RECOMMENDED.

Apparatus required.—Heavy glass tubes without lip, 5 inches by $\frac{5}{8}$ inch, and racks to hold twenty-four tubes in a double row, one above the other. Small test tubes, 4 inches by $\frac{5}{8}$ inch, for serum inactivation. Finely graduating measuring pipettes of 0·1, 1·0, 5·0 and 10·0 c.c. capacities. Graduated cylinders of 50 and 100 c.c. capacities. Erlenmeyer flasks of heavy glass, standard sizes up to 500 c.c. capacity. Large centrifuge cups and small centrifuge tubes. Ampoules and vials. A high power centrifuge machine, large water bath, and incubator room.

All glassware is sterilized by dry heat.

Diluting, Washing and Preserving Fluids.

(1) Normal salt solution—0·85 per cent pure sodium chloride in freshly distilled water. A large quantity should be made up (5000 c.c.) and sterilized in flasks having a siphon attachment.

(2) Citrated salt solution—

Normal salt solution	100·0
Sodium citrate	1·5

(3) Preserving fluid for trypanosomes—

Normal salt solution	90·0
Pure neutral glycerine	10·0
Formalin (Scherings)	0·1

(4) Preserving fluid for serum—

Glycerine	95·0
Phenol	5·0

I.—PREPARATION OF REAGENTS.

A. *The Hæmolytic System.*

(*a*) *Red Cells.*—A quiet sheep may be bled in the standing position, otherwise it should be placed upon its back in a V-shaped trough and held there by the attendant, an assistant shaving the neck and preparing the site of operation. The operator draws from the jugular vein, under aseptic conditions, 50 c.c. (more or less) of blood into a flask containing glass beads and in which the blood is defibrinated. It is then run through a double layer of fine, sterilized gauze into large centrifuge cups, about 20 c.c. of blood in each, adding three to four times the amount of salt solution. The corpuscles are thrown down by centrifugal force, the upper fluid taken away and replaced with fresh salt solution, and the mixture again centrifuged. Washing in this way is repeated three times, when the red cells are carefully measured and suspended in an equal amount of salt solution, this 50 per cent stock suspension being stored in the ice chamber until needed.

(*b*) *Hæmolytic Serum.*—Rabbits have a variable amount of natural hæmolytic amboceptor for sheep's corpuscles—0·1 c.c. of fresh rabbit serum will usually hæmolyze a like amount of 5 per cent corpuscle suspension. For test purposes a serum with a much higher hæmolytic index is required and to obtain this rabbits are hypersensitized or immunized by repeated injection of sheep's corpuscles until a serum is given showing a hæmolytic index of 0·0005.

Not less than six large healthy rabbits should be selected for the immunization, for one or several are apt to die from shock during the process. The rabbits are injected intraperitoneally with a first dose of 2·5 c.c. of the 50 per cent stock suspension of sheep's corpuscles. Every four to five days a further injection is given, each time increasing the dose until, after five or six injections, it has reached 10 c.c. This dose is repeated once or twice. After the sixth or seventh injection 5·0 c.c. of blood is drawn from the heart of each rabbit, using a hypodermic syringe and a fine needle. The operation can easily be performed and does no harm to the animal.

The serum of each rabbit is then heated for one half-hour at 56° C. and the hæmolytic index established by titration (*vide* p. 106). It will be found, probably, that in only two or three rabbits out of six can the hæmolytic index be raised to the desired degree, namely, 0·0005 or better. From such rabbits as much blood is drawn from the heart as will not endanger the life of the animal—about 25 c.c. The rabbits are then kept in reserve and can easily be reimmunized as required.

Finally, the serum is separated from the corpuscles and stored in very small ampoules—0·2 c.c. in each ampoule for convenience and economy—in the ice chamber.

When the serum is not to be used immediately it requires neither inactivation nor carbolization, and is, in fact, better without, the index remaining constant or but very slightly lowered even after six months. But unless the serum has been collected under aseptic conditions, rather than risk it spoiling, 1·0 c.c. of the carbolized glycerine preservative is added to 9·0 c.c. of serum before measuring it into the ampoules.

The whole procedure of immunizing rabbits, drawing blood from the heart, separating and bottling serum, can and should be carried out under aseptic conditions.

(*c*) *Complement.*—Normal guinea-pig serum in a fresh state furnishes a rich complement. Blood may be drawn from the heart, if desired, but as guinea-pigs are usually plentiful at a laboratory it is simpler to anaesthetize the animal in an ether jar, remove and suspend the guinea-pig over a centrifuge tube of 25 or 30 c.c. capacity, sever the arteries and veins on one side of the neck, and collect all the blood.

Centrifuge immediately, before coagulation takes place. The clear serum is taken off and placed in the ice chamber. Complement is always better used in the fresh state so the guinea-pig should not be bled until just before complement is needed for a titration or a diagnostic test.

B. *Dourine (antibody) combining group.*

(*x*) *Antigen.*—A stock dourine antigen is obtained as the result of inoculating a number of white rats with *Trypanosoma equiperdum*, collecting the rat's blood when teeming with trypanosomes, and separating the trypanosomes from blood cells and serum by washing and centrifuging.

The blood of a dourine infected rat is collected in a vessel containing sufficient salt solution to prevent coagulation. Not less than ten large white rats—twenty or twenty-five rats, if a considerable amount of antigen is needed—are inoculated intraperitoneally with the diluted blood, injecting an equal amount, about 0·3 c.c., into each rat. This may be done very conveniently by taking a small sharp-pointed pipette, with rubber tubing and mouthpiece attached, drawing the blood up to a point marked by a file or pencil, and expelling it into the abdomen, repeating the process with the same pipette for each rat. The object is to have all the rats come down together with a heavy infection. In the ordinary course a white rat dies of dourine between the end of the third and the beginning of the fifth day of infection. When twenty-five rats are inoculated at the same time about fifteen of them show a heavy trypanosome infection at the end of the third day, the remainder within the next twelve to twenty-four hours. It is necessary to make a rapid cover-glass examination of the blood of each rat forty-eight hours or so after inoculation and to sort the animals according as they show a light or a heavy infection into two or more groups. The result of the first blood examination will indicate approximately the time for a second examination and upon that the hour for bleeding may be judged. The timing of this operation is important for in the last six or eight hours of infection the trypanosomes multiply enormously, and if the rats are left until well on into this stage a very rich antigen will be furnished. Careful timing, however, is necessary, for it may easily happen that eight or ten rats will all die within one to two hours, if left too long. The bleeding should be carried out as rapidly as possible. The writer's method is simple and effective and may be worth describing in detail:—

A running noose is made out of a 2-foot length of thin copper wire, doubled over in the middle and twisted to the ends, the ends being passed through the ring formed at the beginning of the twist to form the noose and attached to any convenient fixture over a laboratory wash basin, 6 inches above an operating board resting across the basin. An ether jar, a flask of citrated salt solution, two sterile covered beakers and a razor complete the outfit.

An assistant passes the rats one at a time into the ether jar and hands them over as required. The animal is held back downwards in the left hand of the operator whose index or middle finger presses on the left front limb of the rat. The noose is slipped over the head and arranged so that the pull stretches the left side of the neck bending the head slightly to the opposite side, backwards and downwards. A beaker half filled with citrated salt solution is placed in position under the neck, the arteries and veins on that side and close to the shoulder then severed with a single sweep of the razor. Usually, the animals bleed better if one avoids severing the trachea. In this way ten rats may be bled in half an hour. The volume of blood and citrated salt solution should be about equal or a slight excess of the latter. The mixture is then passed through a double layer of sterile gauze to remove any small clots and fibrin into narrow centrifuge tubes, 10 mm. diameter and 10 c.c. capacity (when wider tubes are used it is more difficult to separate the trypanosomes and the wastage is greater). Centrifuge not longer than four to five minutes at 1,500 revolutions per minute so that the bulk of the corpuscles are thrown down while the trypanosomes remain in suspension. Draw off the cloudy suspension fluid into fresh tubes, then the upper layer of corpuscles—more or less mixed with trypanosomes—into another tube, and the next layer into a second tube, adding citrated salt solution and again centrifuging for eight to ten minutes. Draw off and discard as much of the upper fluid as appears clear and free from trypanosomes. Then collect from each tube into a single tube

the upper pure white layer of trypanosomes, in another tube the middle layers slightly soiled with blood, and in a third and fourth tube the lower layers in contact with the blood cells. Add normal salt solution now, not citrate, shake up well and centrifuge again, repeating the washings until all the trypanosomes are obtained in a pure white mass.

Ten rats bled at the right time will furnish 5·0 c.c. of trypanosomes. Twice the volume of the glycerine-formalin preservative is added and the mixture stored in sealed amber ampoules, 1·0 c.c. in each, in a block of ice; 5·0 c.c. of trypanosomes will make 100 c.c. of antigen, sufficient for more than 500 diagnostic tests. The antigen will keep indefinitely if solidified by freezing, and for 6 to 8 weeks or longer when stored in liquid form, in sealed ampoules, on ice.

(*y*) *Antibody.*—In the diagnostic tests the antibody, of course, is or is not present in the suspected test serum. But for purposes of control and titration and to thoroughly understand the combining action of dourine antigen and antibody it is absolutely necessary to have one or more series of known positive or specific dourine horse sera, of which the antibody content can be determined. To obtain this a horse is inoculated with *Trypanosoma equiperdum*. Ten days later and at weekly intervals thereafter, blood is drawn aseptically from the jugular vein, the serum collected and tested for antibody content (*vide* p. 112). A series of specific positive sera are thus obtained, representative of different periods and stages of the disease. Stored in the ice chamber the sera will retain their specific properties for many months, even years, if collected sterile. If not absolutely sterile the serum may be preserved by adding 1·0 c.c. of 5 per cent carbolized glycerine, or the same amount of iodized glycerine to 9·0 c.c. serum. At the same time one should collect and store a number of negative control sera under the same conditions.

II. TITRATION OF REAGENTS.

(1) *Titration of Haemolytic Serum (Amboceptor).*

Prepare the following stock dilutions of serum and corpuscle suspension:—

	c.c.	
1. Haemolytic serum (rabbit anti-sheep)	0·1	
Normal salt solution (0·85 per cent.)	9·9	
	10·0	....1:100
2. Complement—		
Fresh guinea-pig's serum	1·0	
Normal salt solution	19·0	
	20·0	....1:20
3. Corpuscle suspension—		
Washed sheep's corpuscles (50 per cent stock suspension)	2·0	
Salt solution	23·0	
	25·0	....1:25

Further dilutions of the hæmolytic serum are made as under:—

	Salt solution. c.c.	Haemolytic serum. c.c.	
Tube No. 1	3·0	1·0 (1:100)	equals 1:400 (0·0025 serum in 1·0 c.c.)
" 2	5·0	1·0 " "	1:600 (0·0016 " ")
" 3	7·0	1·0 " "	1:800 (0·0012 " ")
" 4	9·0	1·0 " "	1:1000 (0·001 " ")
" 5	0·5	1·0 (1:1000) "	1:1500 (0·00066 " ")
" 6		shrdl aocmfwy aordlu aofwyp aovbgkqj aom	
" 7		shrdl aocmfwy aordlu aofwyp aovbgkqj aom	
" 8		shrdl aocmfwy aordlu aofwyp aovbgkqj aom	
" 9		shrdl aocmfwy aordlu aofwyp aovbgkqj aom	

In each tube 1·0 c.c. only of the dilution is held back, the excess amount being discarded, 1·0 c.c. each of complement and red cell suspension added, which with 2·0 c.c. salt solution make a total volume of 5·0 c.c. in each tube.

The complete titration set is then:—

	Serum Dilutions (as above).	Salt solution.	Complement 1:20.	Red Cell Suspension.	
	c.c.	c.c.	c.c.	c.c.	
Tubes 1–9.....	1·0	2·0	1·0	1·0	Titration set.
Tube No. 10....	1·0	3·0		1·0	Serum control (1:100 dil.)
" 11....	—	3·0	1·0	1·0	Complement control.
" 12....	—	4·0	—	1·0	Red cell control.

Mix well and incubate for two hours at 37° C.

The control set, tubes 10, 11 and 12, must not show any trace of hæmolysis.

The *titre* of the hæmolytic serum is indicated by the amount present in the *last* tube of the series 1 to 9 in which dissolution of all the red cells is *complete*, that is, the least amount necessary to dissolve a definite amount of red cells.

For example, if in tubes Nos. 1 to 6 hæmolysis is complete, not quite complete in tube No. 7, and still less in Nos. 8 and 9, then the titre is the amount of serum in tube No. 6, or 1·0 c.c. of a 1:2000 dilution, 1 unit being expressed as 0·0005.

A serum with a unit value of between 0·0002 and 0·0005 is quite satisfactory, but when the value of a single unit exceeds the latter amount the results are not so good.

The relationship and combined action of hæmolytic amboceptor and complement should be clearly understood. To do this a number of experimental tests should be undertaken, using in one series only one unit of amboceptor with fractional amounts of complement, in another series two units of amboceptor and lesser complement fractions, four units and so forth, progressively multiplying the number of amboceptor units while further reducing the fractions of complement. It will be found, for instance, that two units of amboceptor require a lesser amount of complement than one unit to completely hæmolyse a standard amount of red cells. The lesser the amount of complement that can be safely employed in the practical tests the more delicate becomes the fixation reaction, the equilibrium of the hæmolytic system being more easily upset, even by a test serum naturally weak in antibody content and which, if a relatively large complement unit was employed, might be insufficient to give a complete reaction. On the other hand the reduction of complement must not be carried to such an extreme point that any slightly inhibitive property of one of the other reagents would tend to obscure it and give a false fixation.

It is essential that for all subsequent titrations and tests a standard dose of hæmolytic amboceptor be fixed and rigidly adhered to. For all practical purposes the use of two units of amboceptor permit of a sufficiently fine gradation of complement, while still allowing a margin of safety. The dose is therefore fixed constantly at two units, to which complement is always titrated as in the next procedure.

(2) *Titration of Complement.*

Prepare (1) a stock dilution of guinea-pig complement, and (2) a suspension of sheep's corpuscles, as in the previous titration.

Also (3) an hæmolytic serum (amboceptor) dilution, so that 1·0 c.c. of the diluted serum contains two amboceptor units. For example, if the value of one unit is 0·0005, then 0·001 will be that of two units, the dilution being accordingly 1: 1000.

The titration of complement is of the utmost importance and requires the greatest accuracy, as already indicated. Until one has become familiar with the technique and expert in reading the reactions the titration is best carried out in a double set, the second set having one-half of the amount of each reagent used in the first set, the one serving as a check to the other.

The two sets are arranged as follows:—

Titration of Complement.

	First set.			Second set.		
	Salt Solution c.c.	Complement c.c.	Hæmol. serum c.c.	Salt Solution c.c.	Complement c.c.	Hæmol. serum c.c.
Tube No. 1	2·0	0·3 (1 : 20)	1·0	1·0	0·15 (1 : 20)	0·5
" 2	2·0	0·4	1·0	1·0	0·2	0·5
" 3	2·0	0·45	1·0	1·0	0·225	0·5
" 4	2·0	0·5	1·0	1·0	0·25	0·5
" 5	2·0	0·55	1·0	1·0	0·275	0·5
" 6	2·0	0·6	1·0	1·0	0·3	0·5
" 7	2·0	0·65	1·0	1·0	0·325	0·5
" 8	2·0	0·7	1·0	1·0	0·35	0·5
" 9	2·0	0·8	1·0	1·0	0·4	0·5
" 10	2·0	1·0	0·5	1·0	0·5	0·25
" 11	3·0	.....	1·0	.....	.....	.....
" 12	3·0	1·0	.....	2·0	.....	.....
	Add 1 c.c. red cell suspension to each tube.			Add 0·5 c.c. red cell suspension to each tube.		

Mix well (avoiding undue frothing).

Incubate at 38 to 39° C.

Agitate the mixtures again by shaking the racks after ten minutes incubation.

Read the reactions one hour later.

Tube No. 10 controls the original hæmolytic titration, only one unit of amboceptor being used with an excess of complement. In this tube complete hæmolysis should occur.

Tube No. 1 will show only slight or partial hæmolysis; as one descends the series the reaction is seen to be increased, until, usually between Nos. 4 and 7, a tube is reached in which the reaction is absolutely complete. The first tube in the series in which all the red cells are completely dissolved indicates the complement titre. If this occurs in tube No. 5, for example, then 0·55 c.c. of a 1:20 dilution of complement is the titre, equivalent to 1·0 c.c. of a 2·75 per cent dilution.

For the antigen titration and final tests the complement is accordingly made up so that 1·0 c.c. of the dilution contains the amount of complement indicated by the above titration.

From now on it is optional whether one employs the relatively large amounts of reagents as given in the first set of complement titration, or the one-half amounts as in the second set. The latter is the more economical, especially when a large number of tests are being performed, and is given personal preference to by the writer as it seems to provide an even more highly sensitive test reaction than when the larger amounts are employed.

(3) *Titration of Antigen.*

Dilute 1·0 c.c. of stock trypanosome antigen with 19·0 c.c. of normal salt solution.

Prepare the complement and hæmolytic serum according to their titration values already determined.

Inactivate by heating for half-an-hour at 58° C. in a water bath, 2·0 c.c. of known positive dourine horse serum and 2·0 c.c. of known negative or normal horse serum.

The antigen is then titrated in a double set, the one being with the positive serum, the other with double the amount of negative serum. Thus:—

Controls.	Positive set.				Negative set.			
	Salt sol. c.c.	Known *positive* horse serum c.c.	Antigen c.c.	Complement c.c.	Salt sol. c.c.	Known *negative* horse serum c.c.	Antigen c.c.	Complement c.c.
Tube No. 1	1·0	0·1	0·02	0·5	1·0	0·2	0·05	0·5
" 2	1·0	0·1	0·05	0·5	1·0	0·2	0·1	0·5
" 3	1·0	0·1	0·1	0·5	1·0	0·2	0·2	0·5
" 4	1·0	0·1	0·15	0·5	1·0	0·2	0·3	0·5
" 5	1·0	0·1	0·2	0·5	1·0	0·2	0·4	0·5
" 6	1·0	0·1	0·25	0·5	1·0	0·2	0·5	0·5
" 7	1·0	0·1	0·1	0·5	1·0	0·2	0·6	0·5
" 8	1·0	0·2	.....	0·5	1·0	0·2	.....	0·5
" 9	1·0	.....	0·25	0·5	1·0	.....	0·5	0·5
" 10	1·5	.....	.....	0·5	2·0	.....	.....	.....

Mix well and incubate for one hour and ten minutes at 38 to 39° C.

Mix together equal quantities of hæmolytic serum (amboceptor) and red cell suspension, then add 1·0 c.c. of the mixture to each tube.

Shake again and incubate for two hours longer.

It is usually possible to read the antigen titre in 1½ hours and proceed with the final tests; nevertheless, the tubes should be left or replaced in the incubator for the full two hours and then put on one side for further reference and to see if any further action has taken place.

Tube No. 10 is the control for the hæmolytic system and must show complete hæmolysis. No. 10 in the second set contains only hæmolytic amboceptor and red cells and must not show the slightest degree of hæmolysis. Nos. 8 control the horse serum, Nos. 9 the antigen, the red cells being hæmolysed in all.

The positive set will show more or less complete fixation of complement—no hæmolysis, except perhaps in the first and second tubes, the negative set complete hæmolysis. When the antigen appears very strong there may be some inhibition in the negative set in the tubes containing the larger amounts of antigen.

The amount of antigen to be selected as the titre for the final tests is that which gives complete fixation with the positive serum while double the quantity in the corresponding tube of the negative set does not prevent or inhibit hæmolysis.

III.—THE SERUM TO BE TESTED.

Collection of Serum.—The chief point aimed at in collecting blood from suspected animals is sterility, especially when the specimens have to be transported over long distances and mailed to the laboratory. Absolute sterility is not essential, nevertheless as near as possible aseptic conditions are to be strongly recommended and the avoidance of adding carbolic acid or any other antiseptic fluid to the sample specimen as a preservative. The blood cloth should be well formed and the serum odourless and clear or only slightly tinged with hæmologlobin.

The condition of a sample of blood may vary greatly according to the size and shape of the vial or tube containing it, the slowness or rapidity with which blood is run into the vial, the partial or complete filling of the vial, the shaking of the specimen before coagulation has occurred, and in other ways irrespective of aseptic conditions and of abnormal properties of the blood itself. In square or rectangular

bottles and in specimen vials without a neck the clot has a tendency to cling firmly to the sides, the serum being separated with more or less difficulty. In small round bottles, curved into a narrow neck and mouth, for corks, filled with freely flowing blood to within a margin of the narrowest diameter but not touching the cork, and allowed to stand for at least half-an-hour for coagulation, there is usually an abundance of clear serum.

Such bottles, of one ounce capacity, one inch in diameter, three-eighths inch neck and mouth, are very suitable for field work. They must be absolutely clean and free from any trace of soap, alkali or acid. These bottles are distributed from this laboratory after being sterilized in the hot air oven, corked, labelled and well wrapped in sterile paper wrappers. Also, large bore needles attached to three inches of rubber tubing with a small glass nozzle, separately wrapped and sterilized. With this simple apparatus and observing the usual precautions during operation it is an easy matter to draw blood from the jugular vein of a horse, aseptically.

Among the last 6,000 samples of blood secured in this manner less than twenty have reached the laboratory in a condition unfit for testing and these few unfit specimens have been ten days or more in transit.

On reaching the laboratory the specimens are briefly examined and where necessary the clots are detached from the sides of the bottles with a sterile wire. They are then left to stand in a cool chamber overnight for the serum to clear. The serum is then drawn off into small test tubes, about 2·0 c.c. in each, and is ready for inactivation.

Inactivation of Serum.—Before any specimen of horse serum can be used in the complement fixation test it has first to be inactivated. All animal serum in a very fresh state contains complement in a varying amount. This constituent is readily destroyed by heating the serum to 55 to 56° C. for one half hour. No complement other than that employed in the haemolytic system may take part in the reaction. As a matter of fact horse complement very rapidly becomes inert and in specimens several days old is a practically negligible quantity. However,, in normal horse serum there arise several other factors which, unless destroyed or rendered inactive, are able to act upon complement and antigen and disturb an haemolytic system. All untreated horse, donkey and mule sera possess enzymotic and proteolytic properties, potentially at least, and becoming active in sera a day or two old. They act upon most preparations of antigen, especially upon macerated organs, such as the liver and spleen, and are all more or less anti-complementary, more so in the presence of antigen than without it. Such action, of course, is non-specific and must be eliminated, otherwise it would be difficult or impossible to distinguish a specific from a non-specific reaction. Fortunately it can be eliminated, and the equilibrium of the serum fixed, by a proper and sufficient inactivation. *It is more resistant to heat than is complement and is not wholly destroyed at 56° C.* This is an important point, and one that appears to have been overlooked. I cannot help thinking that it is the explanation and the source of error of many of the apparent failures or discrepancies, especially that of non-specific fixation, which some serologists experience. A reference to the literature on complement fixation methods shows a remarkable lack of uniformity in respect to the degree of heat and the length of time for the inactivation of suspected sera—fifteen to thirty minutes at degrees varying between 50 and 58° C.

A few experiments with sets of ten or twenty different horse, mule and donkey sera, each set being heated for thirty minutes at different degrees between 50 and 62 C. and then tested in the haemolytic system, with and without antigen, will show the importance and necessity of a very careful inactivation and the temperature required (*vide* p. 111).

Method of inactivation recommended.—A water bath, sufficiently large to hold 200 small test tubes, is heated to 60° C. The tubes, containing 2·0 c.c. serum in each (numbered for indentification in waterproof india ink, labels being apt to become detached), are placed within the inner tank which is to contain sufficient water to mount to the level of the serum or to about half the height of the tubes. The cover of

the tank should have two perforations for thermometer tubes which are inserted into control tubes within the tank, enabling the temperature to be read without removing the cover. Another thermometer passes directly into the outer tank. For the first few minutes the temperature will rapidly fall; it is brought up to 59° again—taking about ten minutes—and maintained at that point for a full half hour, for horse serum, and to 62° for one-half hour for donkey or mule serum.

There is no danger of destroying the specific antibodies of dourine sera by heating to the points given. Dourine sera can, in fact, be heated up to 65°, or to the point of coagulation, and still retain an active antibody content to give the test reaction, but the anti-complementary and non-specific factors in horse sera are wholly destroyed at 59°, and in donkey and mule sera at 62°.

To control the inactivation, with each batch of suspected sera several known positive dourne sera as well as known (anti-complementary and non-specific) negative sera are included and all tested together in the final diagnostic test.

Experiment showing the degree of inactivation of suspected serum necessary for specific reactions.

Dose of serum, 0·2 c.c., unheated and heated at different degrees of temperature and tested with trypanosome antigen as in the diagnostic test.

Normal healthy horses.	Unheated serum.	Serum heated for one-half hour at degrees Centigrade. 50	54	56	58	60	62	64–65
No. 1	++++	++++	++	+	–	–	–	–
" 2	++++	++++	++	+	–		–	–
" 3	++++	++++	++	+	–	–	–	–
" 4	++++	++++	+++	++	–	–	–	–
" 5	++++	+++	+	–	–	–		–
" 6	++++	++++	++	(?)	–	–	–	–
" 7	++++	++++	+++	++	–	–	–	–
" 8	++++	++++	+	(?)	–	–	–	–
" 9	++++	++++	++	(?)	–	–	–	–
" 10	++++	+++	++	+	–	–	–	–

Dourine horses.	Inhibition. Non-specific.			
No. 1 (1st year of disease)	++++	++++	++++	++++
" 2 (" ")	++++	++++	++++	++++
" 3 (" ")	++++	++++	++++	++++
" 4 (" ")	++++	++++	++++	++++
" 5 (" ")	++++	++++	++++	++++
" 6 (" ")	++++	++++	++++	++++
" 7 (2nd " ")	++++	++++	++++	++++
" 8 (3rd " ")	++++	++++	++++	++++
" 9 (4th " ")	++++	++++	++++	++++
" 10 (5th " ")	++++	++++	++++	++++

	Specific complement-fixation.						
Normal mule 1	++++	++++	++++	+++	+	–	–
" 2	++++	++++	++++	++++	++ +	–	–
Normal donkey 1	++++	++++	++++	+++	++ +	–	–
" 2	++++	++++	++++	++		–	–

Inhibition. Non-specific.

++++ See page 112 for the meaning of these reaction expressions.

Note.—In the non-specific inhibition reactions the red cells are loosely sedimented. In the specific complement fixation reactions the red cells are precipitated in a mass or agglutinated in clumps. When the sera are tested *without antigen,* as in the serum controls, the dourine sera, of course, give no specific reactions, but the inhibition reactions are given by normal and dourine sera alike when insufficiently inactivated, though to a lesser degree than when antigen is present.

Conclusion.—Suspected horse serum must be heated to at least 58° C. (59 to 60° for safety) and mule or donkey serum to 62° C., to eliminiate non-specific reactions.

The Antibody content of Dourine Sera, and the dose of suspected Serum necessary for a Diagnostic Test.

The maximum dose of horse serum used in a diagnostic fixation test is 0·2 c.c. This amount is not exceeded for fear of any disturbance to the haemolytic system by the non-specific reactions which larger doses are apt to cause. Double the amount can actually be used with perfect safety provided the serum is correctly inactivated. But it is unnecessary to use more than 0·2 c.c., for that amount of serum of a dourine horse will contain in the case of a serum very weak in antibody content at least one unit, and in the case of a serum strong in antibody ten, twenty, forty or more units —and one unit of antibody is sufficient to give a positive reaction with the fixation test.

That this is so may be determined by taking a series of sera collected from animals in active and in latent phases of the disease and titrating out each serum for antibody content.

The experiment is carried out as follows:—

The sera are first inactivated by heating for one half hour at 59° C. Three stock tubes are then taken for each serum, (1) containing the pure serum, (2) a dilution of 1 : 10, and (3) a dilution of 1 : 100, these dilutions permitting of the accurate measurement of the smaller doses.

Twelve tubes are now arranged for each serum to be tested—the first and last to contain 0·2 c.c. of undiluted serum, the largest amount used in the test, the last tube being the serum control without antigen, the intervening tubes to contain gradually decreasing doses of serum. Enough salt solution is then added to make up to 1·0 c.c. in each tube, then the antigen and complement in amounts previously determined by careful titration, and finally, after incubation for seventy minutes, haemolytic serum and red cells—as in a diagnostic test.

An experiment of this kind is given below, the titres of seven sera from different horses in different phases of the disease being determined.

Experiment for determining the Antibody content of Dourine Sera by the Complement Fixation Method.

Dose of inactivated dourine serum. cc.	Complement fixation reaction with dourine serum. No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
0·2 (undiluted.	++++	++++	− + · −	· + · +	++++	++++	+++ +
0·15 standard	· · · ·	· · · ·	· · · ·	+ +++	· · · ·	++++	+++
0·1 doses)	++++	++++	++ · +	++++	· · · ·	· · · ·	++
0·075 (0·75 of 1 : 10)	++++	++++	· · · ·	++++	++++	· · · ·	+
0·05 (0·5 " ")	· · · ·	++++	++++	++++	· · · ·	· · · ·	−
0·025 (0·25 " ")	++++	++++	· · · ·	++++	+++	· · · ·	−
0·01 (0·1 " ")	++++	+++ +	++++	++++	++	−	−
0·0075 (0·75 " 1 : 100)	++++	++++	· · · ·	· ·	·	−	−
0·005 (0·5 " ")	· · · ·	+ · + ·	++++	·	−	−	−
0·0025 (0·25 " ")	++	++	−	−	−	−	−
0·001 (0·1 " ")	+	−	−	−	−	−	−
0·2 (serum control. without antigen)	−	−	−	−	−	−	−
Indicated value of one antibody unit	0·005	0·005	0·0075	0·01	0·05	0·025	0·2
Number of antibody units in 0·2 c.c. of dourine serum — maximum dose.	40	40	26½	20	4	8	1

++++ means complete fixation of complement—absolutely no trace of haemolysis. Red cells more or less clumped. A very strong positive reaction.

+++ is also a strong positive reaction, with just a faint trace or tinge of haemolysis.

++ is a rather weak positive indicating partial fixation—about one-half the red cells haemolysed.

+ a very weak or faint positive—slight fixation, with more than one-half the red cells haemolysed.

—, a negative reaction. Complete haemolysis of red cells.

The smallest dose of serum which combines with antigen to cause complete fixation (++++) indicates the value of one antibody unit, and from this may be calculated the number of units in the standard or maximum dose and the value of a dourine serum in antibody content.

Such values are more relative than absolute, for the titre of a dourine serum may be somewhat higher or lower according to the amount of dourine antigen present and the fineness with which the haemolytic system has been adjusted—just as the titre of the haemolytic serum itself is correlative to the amount of complement and red cells (antigen).

The seven sera, Nos. 1 to 7, used in this experiment are taken from dourine control horses in the first, second, third, fourth, fifth, sixth and seventh year of the disease, respectively. No. 1, from a mare showing clinical symptoms; No. 2 from a stallion showing occasional symptoms; Nos. 3 and 4 from mares very rarely showing symptoms and progressing towards recovery; Nos. 5, 6, and 7 from mares that have not shown any symptoms for three, four and five years respectively, and which have made complete recovery, been bred to a healthy stallion each year—without transmitting infection — and raising healthy offspring.

In addition to the above, among our experimental horses that have recovered from dourine, there are two mares that give a positive (++++) reaction with 0·2 c.c. serum after six years, and one mare a positive (+++) after seven years. On the other hand, there are three mares that have entirely ceased to react, even with twice or three times the amount of serum, after six to seven years of recovery, although they reacted positively up to the fifth year.

Conclusion.—0·2 c.c. of horse serum from a dourine infected animal contains up to forty units of specific antibody. In the case of horses that have completely recovered from dourine and which are no longer able to transmit the disease, one or several units of antibody are present in the same amount of serum up to the fifth year of recovery. After that period they may cease to react—indicating that not only was an absolute recovery made but that the immunity was lost in about five years (proof of which has been given by inoculation experiments with *T. equiperdum* on recovered horses).

For diagnostic tests it is sufficient to use three doses of serum, namely, 0·2, 0·15 and 0·1 c.c.

The first appearance of a positive serum reaction in dourine infections.

Having fixed upon a standard dosage of suspected serum, it is now necessary to know the incubation period of dourine and when a first positive serum reaction may be expected, for otherwise a negative reaction would be valueless or even misleading.

In this connection there follow the records of some experiments:—

Experiment for determining the length of time between dourine infection and the first appearance of a positive serum reaction.

A healthy filly, 2½ years old, was infected with dourine by smearing over the vaginal mucosa a few drops of blood containing *Trypanosoma equiperdum*.

Serum was collected from this young mare before infection and daily up to the fifteenth day after infection, and tested by the complement fixation method, with trypanosome antigen. The results were as follows:—

Dose of serum c.c.	Before infection.	Days after infection.					
		1 to 10	11	12	13	14	15
0·2	–	–	+++	++++	++++	++++	++++
0·15	–	–	–	++++	++++	++++	++++
0·1	–	–	–	+++	+++	–	++++
0·05	–	–	–	++	++	++++	+++
0·01	–	–	–	–	–	+	++
0·005	–	–	–	–	–	–	+

Thus, the first appearance of a positive serum reaction was eleven days after infection.

In three earlier experiments of this kind, but in which serum was not collected for testing until the twentieth day after infection, the reaction in each case was strongly positive.

The incubation period of dourine in the light of the complement fixation test is indicated, by the above experiments, as not less than eleven days and not over twenty days. However, the strain of dourine used in these experiments was of high virulence; when horses become infected with strains of low virulence—and there is much variation in dourine strains—the incubation period is probably prolonged.

A negative reaction should not be taken as final or conclusive when the interval between exposure to infection and the collection of test serum is less than two months.

IV. THE DIAGNOSTIC TEST.

Two methods of procedure are here recommended:—

(1) When only one or several tests are to be made.

(2) For daily routine testing or when 50, 100, or more tests are to be made at one time.

In either case a necessary preliminary is the titration of complement (vide, p. 108). This established, sufficient complement dilution is made up—0·5 c.c. of the dilution to contain the smallest amount indicated by titration—to do for the titration of antigen and for as many serum tests and controls as are to be made. It is advisable to make up an excess of complement rather than have a deficit, so as to use one stock uniform dilution throughout and avoid having to make up fresh stocks during the testing.

The trypanosome antigen is then titrated against a known positive dourine serum and a known negative serum (*vide*, p. 109).

First method of procedure—for one or several tests.

Four tubes and one pipette of 1·0 c.c. capacity, graduated 1 to 100, are needed for each serum to be tested. 1·0 c.c. salt solution is measured into each tube. In each set of four tubes 0·2, 0·15, 0·1 and 0·2 c.c. of the inactivated test serum is added. Antigen in the amount already decided by titration is now added to the first three tubes in each set, omitting it from the fourth tube which serves as a serum control. Complement, 0·5 c.c. of the dilution required, is then added to all tubes. Sets of positive and negative sera are included with the above, and, in addition, controls for the various reagents. For the reagent controls five tubes are needed: (1) Antigen control, omitting the test serum, (2) haemolytic control, omitting serum and antigen, (3) haemolytic serum control, omitting test serum, antigen and complement, (4) complement control, omitting test serum, haemolytic serum and antigen, (5) red cells control containing only red cells and salt solution. The controls are made up to a uniform volume of 2·5 c.c. by adding salt solution as required.

When the test serum, antigen and complement have been mixed together, the tubes are incubated at 38 to 39° C. for 70 minutes.

Equal quantities of the haemolytic serum dilution and the red cell suspension (4 per cent) are mixed together and 1·0 c.c. of the mixture added to every tube excepting the last two controls, Nos. 4 and 5, to which 0·5 c.c. red cells only are added.

The tubes are again shaken and incubated for another two hours when the reactions may be read, a second reading being made the following morning, about twelve hours later, the racks being left at a cool-room temperature meanwhile.

The above procedure is indicated in the following table:—

TABLE showing method of procedure for a diagnostic fixation test.

	Tube No.	Salt solution c.c.	Test serum c.c.	Antigen c.c.	Complement c.c.	Mixture of haemolytic serum and red cells c.c.	Fixation	Reaction	
Diagnostic set for each suspected serum.	1.	1·0	0·2	0·2	0·5	1·0	+ + + +	*Strong positive.*	*Weak positive.*
	2.	1·0	0·15	0·2	0·5	1·0	+ + + +		
	3.	1·0	0·1	0·2	0·5	1·0	+ + + +		
Serum control.	4.	1·0	0·2	—	0·5	1·0		(haemolysis)	(haemolysis)
Test control with known positive serum	1.	1·0	0·2	0·2	0·5	1·0	+ + + +	Complete fixation.	
	2.	1·0	0·1	0·2	0·5	1·0	+ + + +	"	
Serum control	3.	1·0	0·2	—	0·5	1·0		Complete haemolysis.	
Test control with known negative serum	1.	1·0	0·2	0·2	0·5	1·0	—	Complete haemolysis.	
	2.	1·0	0·2	—	0·5	1·0	—	"	
Reagent controls :									
(*a*) Antigen	1.	1·0	—	0·2	0·5	1·0	—	Complete haemolysis.	
(*b*) Haemolytic system	2.	1·0	—	—	0·5	1·0	—	"	
(*c*) Haemolytic serum	3.	1·5	—	—	—	1·0	..	No haemolysis.	
						Red cells only.			
(*d*) Complement	4.	1·5	—	—	0·5	0·5	..	"	
(*e*) Red cells	5.	2·0	—	—	—	0·5	..	"	

70 minutes at 38-39° C.

2 hours at 38-39° C. First reading of reactions.

12 hours at cool-room temperature. Second reading of reactions.

Second method of procedure—for daily routine testing or when 50, 100, or more tests are to be made.

This is only a slight modification of the first method of procedure to allow of more rapid and less laborious work in testing large numbers of suspected sera.

Two test series are made, the first series, in which only one tube for each serum is used (instead of four tubes as before), containing the maximum dose, 0·2 c.c., and antigen, eliminating all negative sera and at the same time indicating the positive sera. These latter are again tested on the following day, using the four tubes—the three standard doses of serum and serum control—as in procedure No. 1, including them with the next lot of sera to undergo the first test in which the single tube is used.

If a negative serum does not give a fixation reaction with 0·2 c.c. serum it certainly will not with the lesser doses, and as a serum control is only needed in the case of a serum which fixes complement, the single tube is obviously all that is required to determine a negative serum. Further, the sera with which complement fixation takes place in the one series serve as additional controls when included with and fully tested out in the second series—one day's work thus checking the other, continuously.

In routine testing at this laboratory, when large numbers of sera are being dealt with, it is the practice to make a repeat test with each serum negative at the first test and to arrange the work and the different series so that each day's tests include: (*a*) a series not before tested (one tube for each serum); (*b*) the sera tested the day before with negative result (one tube for each serum); (*c*) the sera tested the day before with fixation reactions (four tubes for each serum); and, in addition, the usual series of known positive dourine sera, negative controls and reagent controls.

All suspected sera are thus tested twice over so that if any error or omission in the technique has been made it will surely be indicated.

Interpretation of the reaction.—Fixation of the complement, not in itself visible in the test tube, is indicated by the prevention of haemolysis of the red cells and constitutes a positive reaction, on which a diagnosis of dourine is given.

When no complement is fixed the red cells are completely haemolysed and the reaction is then said to be negative.

The prevention or inhibition of haemolysis may be complete, partial or slight—according to the richness of the serum in specific antibodies. However, with the standard doses of serum, in the great majority of cases, the reaction is either clearly positive or clearly negative. Occasionally, complement fixation complete with 0·2 c.c serum, partial with 0·15 c.c. and slight with 0·1 c.c. may be given. This is a positive reaction and indicates that the serum is weak in antibodies, only one unit being present in 0·2 c.c. serum.

Partial fixation with 0·2 serum and complete haemolysis with 0·1 serum is a rare reaction and of a questionable nature. In the serum controls, without antigen, haemolysis should always be complete. Very rarely indeed it happens that haemolysis in the serum controls is not complete, the mixture having a cloudy or opaque appearance and some of the red cells remaining unhaemolysed. This may be the result of insufficient inactivation or of changes in the serum due to certain bacterial growths. When such questionable reactions are given a fresh specimen of serum is asked for and a retest made.

GENERAL REMARKS.

The successful practice of the complement fixation test depends mainly upon the preparation and use of powerful reagents, their specificity and the accurate determination of their relative values, the fixing of standard doses wherever possible, and a constant, uniform technique and method of procedure.

Close familiarity with the activity of the reagents is essential for the best results.

Stock reagents should be prepared in quantities calculated to meet all requirements for as long a time as the activity of the reagents remains practically constant. Thus:

sufficient hæmolytic serum for six months' work; antigen to suffice for one month's work; fresh red cell suspension once a week; fresh complement daily or on alternate days, or as needed. It is advisable to use the blood of two sheep for sensitizing rabbits and to use the red cells of the same sheep for the haemolytic system.

The following points of extreme importance will bear repetition:—

(1) The amount of red cells in suspension must be very accurately measured and the standard amount never varied.

(2) The use of the least possible amount of complement which with two units of haemolytic serum causes complete haemolysis of red cells.

(3) The use of twice the amount of antigen which with a dourine antibody unit is necessary to fix the complement, provided the same amount of antigen alone has no inhibitory action.

(4) Careful control of the inactivation of suspected sera by known positive and known negative sera.

(5) Control of the diagnostic tests by a series of known positive sera, each having an antibody unit of different value, high to low.

DISCUSSION.

The reliability of the complement fixtation test as a certain and specific means of diagnosis has been questioned, not, I think, very seriously or on strictly scientific grounds, but more in respect to its practical application and on an unwarranted supposition that it is still very imperfectly understood, that the technique and method of procedure is so intricate and laborious, that the reactions themselves are subject to and have to be guarded against so many possible disturbing influences that the adoption of such method of diagnosis is attended with considerable risk.

Can the test be practically applied?—Yes, without doubt, and with as much ease as a mallein or tuberculin test it applied. In the one case blood is collected in the field and sent in for a laboratory test, in the other the reagents are prepared in the laboratory and sent out for a field test. Further, as many retests can be made by the complement fixation method as desired, for no toxins or immunizing substances are injected into the suspected animal to interfere with subsequent diagnostic tests. This test is no longer a new departure in veterinary diagnoses; it is successfully applied in glanders, contagious abortion and in other specific diseases and is yearly coming into more general use.

Are the test reactions and the different factors concerned in them imperfectly understood?—Such a view is not held by serologists and can only be retained by those who have not the opportunity of closely studying the subject and becoming familiar with the finer points of it. Any attempt to apply the test by one who has not thoroughly mastered the technique and gained complete control of the reagents would, of course, be dangerous. But the complement fixation reaction furnishes the most perfect, biological, diagnostic test yet devised, one in which all adverse or disturbing factors can be eliminated and in which a clear knowledge of the properties and mode of action of the reagents has been ascertained,—far more so, in fact, than that of a mallein or tuberculin reaction which, in application and interpretation, is crude in comparison. The very delicacy of the fixation reaction and the strict laws and conditions governing it, add to the exactness, value and reliability of the test.

Is the technique too intricate and laborious?—Not more so than many other necessary and accepted laboratory methods, and this is essentially a laboratory test.

Is it necessary to use a pure suspension of trypanosomes as antigen?—By the employment of a pure suspension of dourine trypanosomes as antigen non-specific and false or misleading reactions are avoided. Many other ways of preparing antigen

for the dourine test have been tried by different investigators but, with one exception, with little success. Mohler and Eichhorn recommend a spleen preparation of a rat dead from surra. I have used the spleens of rats dead from dourine in several thousand tests and with very good results, but, on the whole, such preparations are inferior to the trypanosome suspension and possess a number of disadvantages. Spleen preparations are often troublesome on account of a more or less anticomplementary action or owing to a weakness in specific antigenic property. They are very unstable and of inconstant value and give rise to many borderline or questionable reactions which can be eliminated or definitely decided by the trypanosome antigen. In comparative titrations of dourine sera with the two forms of antigen I have found that approximately one-tenth of the amount of serum necessary for a positive reaction with spleen antigen suffices for a clear positive reaction with trypanosome antigen. Very weak positive reactions with the former become clearly and strongly positive with the latter, which, therefore, should always be given the preference. The trypanosome suspension has also the great advantage of retaining a constant value for several weeks at least, for six to eight weeks if carefully prepared, and thus allows of the keeping of a uniform stock antigen.

What is the percentage of positive reactors in dourine outbreaks?—This of course varies according to the length of time the disease has been in existence in a stud or range herd before being checked by preventive measures. In the most extensive outbreak that we have had to deal with 456 positive reactors were found in a total of 2,000 animals tested; nearly 23 per cent. In an outbreak on an Indian Reservation, 127 animals gave positive reactions out of 1,464 tested, or less than 9 per cent. Usually it is between 15 and 20 per cent. Our experience indicates that 100 per cent of dourine infected animals, whether in active or latent stages of disease, give positive serum reactions, provided that an interval of two to three months has been allowed for an incubation period in the more or less resistant animals, less than one month being sufficient in most cases.

How does the value of the dourine test compare with the Wassermann test for syphilis?—The old name of horse syphilis still clings to dourine infections, especially among stock owners and the general public, and comparisons have been made both in regard to the nature of the disease and the diagnostic tests, tending to lead to mistaken conclusions.

The reaction in dourine by the method recommended in this paper is a specific one. A positive reaction in other diseases or with animals in which dourine infection could be excluded, remains unknown to us, while in every authentic case of dourine the reaction is invariably positive. In my whole experience there is only one case in dispute—a negative serum reaction being given where a symptomatic diagnosis of dourine was made. However, the symptomatic diagnosis may have been at fault; unfortunately, the animal was destroyed before any proof or disproof of dourine infection was forthcoming.

The very few cases on record where a negative dourine reaction at a first test was followed by a positive reaction at a second or later test can be accounted for by infection taking place only a few days before the serum was first collected, or by continued exposure to infection between the first and later test.

In syphilis, on the other hand, negative reactions are of more value for prognosis than for diagnosis. A positive reaction may become negative after a short course of treatment returning again to positive if a cure has not been effected. Further, it is admitted that a negative reaction is frequently given in primary syphilis and again at times in latent and tertiary syphilis. A source of error, operating in the negative direction, is, as Noguchi has pointed out, in that human serum contains a variable amount of natural anti-sheep amboceptor, which in some cases may be sufficient to

hide a positive reaction. Horse serum does not contain anti-sheep amboceptor, as I have found by many experiments, so that the anti-sheep haemolytic system can be used in horse serum tests with perfect reliance.

A positive Wassermann reaction may be given in several diseases in which syphilitic infection can be excluded, in leprosy, scarlatina, certain forms of tuberculosis and carcinoma. The Wassermann reaction is not specific. Owing to the great difficulty of obtaining a pure syphilitic antigen, the extract of a syphilitic liver was first used in Wassermann's original method. But, later on, it was found that non-specific extract of normal liver and other organs answered equally well, and such are now commonly used. The reaction in syphilis is not accordingly a true and specific antigen-antibody combination and is dependent upon more or less gross changes in the serum of syphilitic patients. It is not to be compared, therefore, and is greatly inferior to our test method for dourine either in delicacy, specificity or trustworthiness.

In conclusion, I venture to express absolute confidence in the complement fixation test for dourine as it is now presented, and to claim that apparent failures or discrepancies are due, not to the method itself, but to faulty technique on the part of the operators or of the collectors of the test serum.

APPENDIX No. 15.

(Seymour Hadwen, D. V. Sci., pathologist in charge, Agassiz, B.C.)

Agassiz, B.C.

Sir,—I have the honour to submit my annual report for the year ending March 31, 1915.

The investigations which were undertaken during the year were varied. The addition to the laboratory has been of great assistance.

In October, Mr. G. H. Unwin handed in his resignation, to take up military duties in Vancouver. Since that time I have been without assistance in the laboratory, and many of the duties which were undertaken by Mr. Unwin have fallen on my shoulders. It is to be hoped that before long it will be possible to secure the services of another assistant, as it will be impossible for me to do all the routine work, as well as the investigations which are so urgently needed in this province.

My annual report this year is brief, owing to the unfinished state of many of the experiments.

BOVINE HAEMATURIA

The experiments have been continued throughout the year, and a distinct advance has been made. However, as some are not yet complete, it is thought advisable to withhold them until a complete summary of the work can be given.

The interest shown by the farmers in this disease is again becoming manifest. For the past three years comparatively few letters on the subject have been received; now, owing no doubt to the financial depression, numerous inquiries are coming in. Previously, farmers sold their diseased animals for what they could get, or killed them, often at a sacrifice; now they are anxious to make the utmost out of their animals, and their interest in the diseases has revived correspondingly.

The work described last year is being carried through, and experiments with oxalic acid have been successful. There is no doubt in my mind that the theory I advanced in my previous report is correct; but since the multiplication of results is necessary before proof is conclusive, I am deferring publication till all the experiments now under way are completed.

AN OBSCURE DISEASE AMONG CATTLE IN THE KAMLOOPS DISTRICT.

Several journeys have been made to this district to study what is thought to be a new local affection among the cattle and sheep. The reports which I have sent to you deal with this question in fuller detail than can be given here. Authority has been given to continue experiments on a larger scale, both at the Experimental Farm here, and in the affected district.

"BIG KNEE," A DISEASE IN CATTLE.

Early in the year a journey was undertaken to Alexandria, on the Cariboo road. A small percentage of cattle have been found affected each year with swellings in the joints. On the date of my visit, eight diseased animals were found.

The external swellings were visible principally on the knees, but after killing two of the animals it was found that the other joints were affected, though the swellings were not so prominent. The disease causes the animals great pain; it is not of a suppurative nature, nor were any bacteria found in the lesions.

The animals become emaciated, and as a rule the disease progresses slowly but surely until they die. One or two recoveries have been noticed, but the animals were left in a crippled condition. It is intended to make a further study of this disease when opportunity offers. The theory which you have advanced, that it is of a rheumatoid nature, will be carefully worked out.

AN INVESTIGATION INTO THE SYMPTOMS OF PIGS FED ON RICE MEAL.

At the request of Mr. J. H. Grisdale and Mr. P. H. Moore, Superintendent of the Experimental Farm, Agassiz, I have been co-operating with them in their experiments. This course was sanctioned by you.

The first report of this work was published in the annual report of Experimental Farms for 1913-14, and this year a second report will appear in the same publication.

Owing to the great interest which is being taken in nutrition diseases, especially in beri-beri, to which this affection is so closely allied, the work seems worthy of continuation.

TICK PARALYSIS.

There is very little to add to the previous work on this disease, though one or two reports of the occurrence of tick paralysis were received at the laboratory.

A few additional notes have been made on the habits of Dermacentors, and some new hosts have been added to the list, which is given below.

Since the publication of my first paper in 1913, in *Parasitology* (Camb.), and that of Hadwen and Nuttall in the same issue, other articles have appeared dealing with the same question. A review on Tick paralysis in man and animals was published by Nuttall in Parasitology, vol. 7, No. 1, 1914. He proved that tick paralysis was a definite disease and could be transmitted by ticks of different species; but that the only real experimental evidence produced had reference to *Dermacentor venustus* alone.

A paper by Mally, 1904, and Borthwick, attributes a disease called "tick paralysis" in sheep in Cape Colony, to the animals being attacked by *Ixodes pilosus,* Koch.

Todd, in the Journal of Parasitology, Urbana, vol. 1, No. 2, reviews some more cases in the human subject, and at the end of his paper describes some unsuccessful experiments on animals.

Additions to the list previously published, Appendix No. 9, pp. 93-99, Health of Animals Report, 1913:—

Genus Ixodes.

Ixodes ricinus L. det. S.H.

1 ♀ off dog,
Victoria, B.C. 8/30/12 (Coll. E. M. Anderson).
Several ♀'s off *Odocoileus columbianum,*
Duncan, B.C. 18/12/12 (Coll. S. H.)
1 ♀ off man,
Goldstream, B.C. 1/2/12 (Coll. E. M. Anderson).
♂'s and ♀'s off dog,
Maple Bay, B.C. 15/11/12 (Coll S. H.)
10 ♀'s and ♂'s off dog,
Maple Bay, B.C. 19/3/14 (Coll. D. Ashby).

Ixodes texanus—

1 ♀ off *Sejurus h. douglassi,*
Agassiz, B.C. 6/7/12.

Ixodes hexagonus var. *cookei* (Packard, 1869) det. Nuttall,
1 ♀ off dog,
Mount Lehman, B.C., 1914 (Coll. S. H.).

Ixodes pratti Banks, det. S. H.
1 ♀ off horse,
Milk River, Alta. Summer, 1913 (Coll. S. H.).

Ixodes auritulus, Neumann, 1914, det. Nuttall.
1 ♀ off *Haliaetus leucocephalus alascanus* Townsend,
1 ♂, 10 L., off *Cyanocitta stelleri carlottæ,*
Masset, Queen Charlotte Islands, B.C. 23/6/10 (Coll. E. M. A.).

One more species of Ixodes has been taken of which the identity has not yet been established.

Genus Hæmaphysalis.

Hæmaphysalis punctata C. and F. now becomes, according to Nuttall *Hæmaphysalis cinnabarina* Koch, 1844, as this last name has priority over *H. chordeilis* Packard. Types are 2 ♀ in the Berlin Museum.

H. cinnabarina occurs in both North and South America, while in Europe *H. punctata, C. and F.,* now becomes *H. cinnabarina* var. *punctata.*

Hæmaphysalis leporis palustris Packard,
off rabbits, Prince Albert, Sask., 8/6/14 (Coll. Dr. F. Torrance).
87 ♂'s, 21 ♀'s and L., off rabbit,
Agassiz, B.C. 18/5/12 (Coll. S.H.).

NOTE.—This last record indicates that the sexes copulate upon the host. These ticks were kept together in a large glass container for several days, and watched carefully to see if copulation ever took place off the host. This was not seen to take place, and no ticks were found in copula.

Genus Dermacentor.

Dermacentor venustus.. 13 ♂'s and ♀'s captured on *Nectoma cinera* (Bush-rat), at Okanagan Falls, B.C., 1913; collector, E. M. Anderson.
On a bear at Creston, B.C.; collector, J. D. Frank.

NOTE.—The finding of adults on *N. cinera* is of importance, owing to the idea, prevalent in the United States, that only immature stages are to be found on rodents.

FOLLICULAR MANGE.

Last year a short report was made on a specimen sent in by Dr. White. A fresh case of this interesting disease has been discovered on the Experimental Farm. Treatment is being undertaken, but is not sufficiently advanced to warrant the publication of results. I attach a photograph of the animal, showing the extensive lesions, which have invaded the whole of the fore-trunk (plate 1, figs. 1 and 2).

WARBLE-FLY INVESTIGATION.

During the past winter and early spring a careful watch has been kept on the gullets of cattle, to try to discover the migration of the larvæ from that region to the back. Dr. E. A. Bruce and his staff at the abattoir of P. Burns & Co., have collaborated with me in this study. With Dr. Bruce I have prepared a paper, which is now ready for publication.

SESSIONAL PAPER No. 15b

During the past summer, observations were made on the egg-laying habits of both *Hypoderma bovis* and *Hypoderma lineatum*. The publication of this work was sanctioned by you, and appeared in volume 7, No. 4, of *Parasitology* (Camb.). I would refer interested persons to this publication.

Other observations were made on *Cuterebra fontinella* Clark (Cotton-tailed Bot). I would recommend the reprinting of this article as an appendix to my report, since it has a bearing on the problem of the penetration of the larvæ of warble-flies in general.

BLOOD-SUCKING DIPTERA.

For some years notes have been made on the habits of blood-sucking diptera in British Columbia, especially of the *Tabanidæ* (Horse flies). A paper was prepared giving a list of the varieties encountered in this province, and some notes on their habits. This list was published in the proceedings of the Entomological Society of British Columbia.

Another short paper was read, on the occurrence of *Anopheles maculipennis*, one of the known transmitters of malaria.

PATHOLOGICAL SPECIMENS.

The number of specimens sent in yearly is increasing. A considerable number have been received from the meat inspection staff of P. Burns & Co. The diseases encountered were as follows, in order of importance: rabies, tuberculosis, blackleg, and several varieties of cancer and cysts from cattle and swine. Specimens of poultry diseases have also been received, and a number of parasites, ectozoa and entozoa.

An interesting specimen came from Dr. Richards of Charlottetown, P.E.I., who sent me a warble larva which he had extracted from a horse. This is of comparatively rare occurrence.

Another specimen worthy of mention, from Dr. Bruce, showed a case of chronic hyperplasia of the spleen. A photograph made by Dr. Jarvis is attached to this report (plate 2, fig. 1). Some specimens have also been received from medical men.

I have the honour to be, sir,
Your obedient servant,

SEYMOUR HADWEN,
Pathologist in charge Research Laboratory.

APPENDIX No. 16.

SUMMARY REPORT ON SAMPLES SUBMITTED BY THE MEAT INSPECTION DIVISION.

By Frank T. Shutt, M.A., D.Sc., *Dominion Chemist.*

This work, which has been carried on in the laboratories of the Experimental Farm system since 1908, consists in the chemical and microscopical examination of samples collected by the inspectors of the Meat Inspection Division in the course of their inspection duties at the various packing houses and fruit and vegetable canneries throughout the Dominion. The object of this investigational and control work is to determine the nature and purity of the several products examined, in order that the latter as put out may conform to the regulations and meet the requirements or standards established by law for the protection of the consuming public.

The nature, character and scope of the work, as at present carried on, have been outlined in the following paragraphs.

Food preservatives.—From ancient times, various processes have been employed for the preservation of foods. These include chiefly, drying, smoking, salting, preserving with sugar, and pickling with vinegar. In more recent times the sterilization by heat and the subjection to low temperatures (cold storage) to arrest or prevent changes in perishable food products, have been largely used. All of these, if satisfactorily conducted, may be regarded as unobjectionable.

The modern practice of employing chemicals, such as boric, salicylic, benzoic, and sulphurous acids and their salts, for the preservation of foods, has added greatly to the work of the chemist. It is highly important to know if these compounds have been used to arrest fermentation and, if so, to what extent. The use of certain of these preservative chemicals is entirely forbidden in foods, while in the case of others the amount that can be employed is strictly regulated.

In the work of the year, the analysis of a large number of preservatives and preservative mixtures, as used in the several packing and canning establishments, has been undertaken. It has also included, in this connection, the critical examination for preservatives of a very considerable number of samples of prepared meats and meat products, sausage, etc.

Numerous samples of benzoate of soda, sulphite of soda, borax, nitrate of soda, etc., etc., have been examined as to purity and adherence to the regulations.

Colouring Matters.—The presence of artificial colouring matter in food products is a matter that in these days must engage the careful attention of the food chemist. The object in the use of such colouring matter may be to mask an objectionable condition of the product or to meet an alleged public demand for a more or less highly coloured product. The presence of permitted colouring matter may be allowed in certain products while entirely forbidden in others.

The artificial colourings now used in food products are almost entirely coal tar colours. The regulations permit only seven of these, and these must be free from arsenic and heavy metals. Reference to the subjoined table shows that numerous dyestuffs have been examined as to nature and purity. Many samples of food products, meats, spices, condiments, etc., have also been submitted to analysis with the object of determining the presence of added colouring matter.

Excess Water, and Cereal in Meat Products.—In addition to the examination for preservatives and artificial colouring matter, meats and meat products, sausage, mince meats, etc., have been subjected to analysis with the view of ascertaining if they contain excessive amounts of water and cereal.

Spices and Condiments.—Spices and condiments have been more particularly examined for the presence of foreign material, as starch, colouring, and preservatives.

Desiccated Fruits and Vegetables.—During the year a large number of samples of evaporated apples have been analysed as to water-content. An excessive amount of water in desiccated fruits and vegetables, constitutes not only a worthless make-weight, but is a menace to the keeping qualities of the product, as it favours the growth of moulds and bacteria.

The Bleaching of Fruits and Vegetables.—Since the subjection of fruits and vegetables before desiccation to the fumes of burning sulphur is a common practice for the purpose of bleaching, preventing discolouration, and to prevent the attacks of insects, fungi, and bacteria, the examination of many such samples of dried products has been necessary to ascertain if the sulphurous acid remaining in them exceeds the amount permitted by the regulations.

Lards and Lard Compounds.—Lard, lard compounds, and their constituents have been analysed as to composition and purity. This examination has entailed a considerable amount of research work of a chemical and physical nature.

Samples examined.—A classified statement of the samples examined during the fiscal year ending March 31, 1915, is as follows:—

SAMPLES Received from the Meat Inspection Division, 1914-15.

Nature of Sample.	Number Received.
Lards, tallows, oils, butters	13
Preserved meats, sausage, mince meats, etc	123
Colouring and dyestuffs	147
Preservatives	145
Pickling solutions	50
Spices and condiments	129
Evaporated apples and waste	26
Miscellaneous	29
Total	662

The increase in the work during recent years is shown in the following figures:—

1911	(samples examined)	86
1912	"	86
1913	"	185
1914	"	510
1915	"	662

Brief mention may be made of certain special investigations recently undertaken.

Ink.—In the branding of meats at the inspected establishments, a considerable amount of ink is used. The requirements for such an ink are that it should be easy of application and not "run," that it should dry quickly and that it should not easily blur, erase, or bleach. After considerable experimental work in the Farm Laboratories, an ink satisfactory as regards the foregoing requirements was prepared. This

ink is now being made at the laboratories for use by the inspectors and incidentally, it may be remarked, that its cost is much lower than that of the purchased ink previously employed.

Disinfectants.—Special attention has been given to the examination of commercial disinfecting compounds, marketed chiefly under the name of crude carbolic acid. This has been made necessary by the extensive use of these materials for the disinfection of stock yards, cars, etc., following the outbreak of the foot-and-mouth disease in the United States. The results constitute a valuable addition to our knowledge of these compounds.

Acknowledgement.—In concluding this outline of the work accomplished, I wish to bear testimony to the skill and the careful, valuable work of Mr. C. H. Robinson, B.A., Assistant Chemist, who for some years past has been specially in charge of the analytical and microscopical investigations necessary to a satisfactory examination of the samples submitted.

APPENDIX No. 17.

(L. L. Cooke, Chief Inspector, Live Stock Cars and Yards.)

OTTAWA, March 31, 1915.

SIR,—I beg to submit herewith my report for the year ending March 31, 1915.

My duties during the major portion of the period were confined to the various live stock markets, as well as to the railway and other stock yards used for the public accommodation of animals, either in transit or when offered for sale.

The progress in this work has been greatly improved in the past year, and at the present time it is difficult to find a railway or other stock yard which is not in a clean, comfortable, and sanitary condition. The same is true of stables owned by the railway and stock-yard companies at the principal shipping points, and at every large public stable in which horses or other live stock are held for sale or shipment.

A marked improvement has been made with regard to all stock cars used for conveying live stock. They are cleansed and disinfected by the various railway companies, under the supervision of car inspectors, at all the principal divisional points, and it is somewhat difficult to find a dirty stock car on any of the railway lines to-day.

I have personally supervised the cleansing and disinfecting of a large number of stock cars at Ottawa, especially those conveying hogs from the western provinces to Hull, and then transferred to Ottawa to be cleansed and disinfected. The manure from these cars was stored in an isolated place and burned to prevent any chance of spreading disease.

I have also kept in close touch with all the boundary points where stock cars from the United States are transferred from one railway to another, and have enforced ministerial order 33, section 3, which is, that all stock cars, whether of Canadian origin or not, and whether empty or conveying merchandise other than live stock, entering Canada from the United States, must, if not already showing evidence of having been so treated, be thoroughly cleansed and disinfected to the satisfaction of an inspector of this department; otherwise they will be returned to the United States.

There have been small stock pens erected at Bishop's Crossing, Valley Junction, Tring Junction, St. Sabine, and at several other small places on the various railways. At the Union stock yards, Toronto, several improvements have been made for the handling of live stock during the past year, and the company have constructed sixty-two new cattle pens, together with eighteen receiving pens. The Grand Trunk chutes have been extended by adding nine additional chutes, and they now have thirty-six unloading chutes. The Canadian Pacific chutes have been extended by adding nine, and they now have twenty-nine unloading chutes. There can now be unloaded sixty-five cars of live stock at one time.

The above cattle and receiving pens have all been paved. New horse corrals have also been constructed next to Keele street, adjoining the yards, with a capacity for five hundred head. The disinfecting yards belonging to the Michigan Central railway at Montrose, and the one belonging to the Grand Trunk railway at Bridgeburg have undergone some minor repairs, and are kept in good condition. The manure from stock cars is stored for a period of three months in these yards before being removed, to prevent any chance of spreading disease, as these cars are brought from points in the United States and cleansed and disinfected in these yards.

During the latter part of the year my time was fully occupied in carrying out the embargo regulations against the introduction of foot-and-mouth disease from United States. I proceeded along the St. Lawrence river from Toronto to Montreal and organized a patrol to carry out the embargo regulations.

Later my time was fully occupied in supervising the handling, isolating, and transportation of remount horses from the United States. New open yards were constructed at Windsor and Toronto to accommodate five thousand remount horses in each place. A new yard was also erected at Dixie, near Montreal, to accommodate twelve thousand horses.

In conclusion, I would state that the different inspectors stationed at the divisional points where stock cars have been cleansed and disinfected have enforced ministerial order 37, and the officers in these divisions have had the co-operation of the different railways in this work.

I have the honour to be, sir,
Your obedient servant,

L. L. COOKE,
Chief Inspector Live Stock Cars and Yards.

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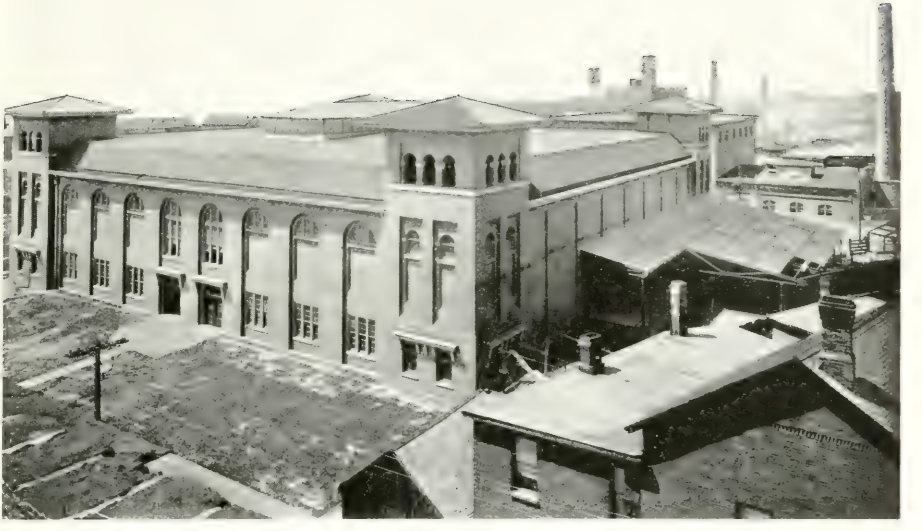
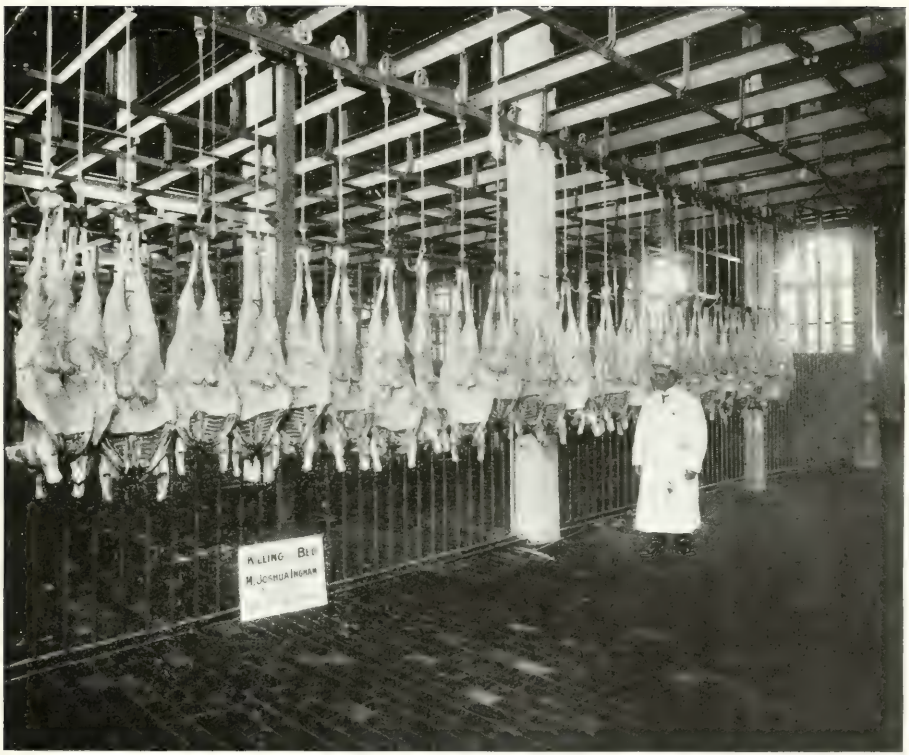
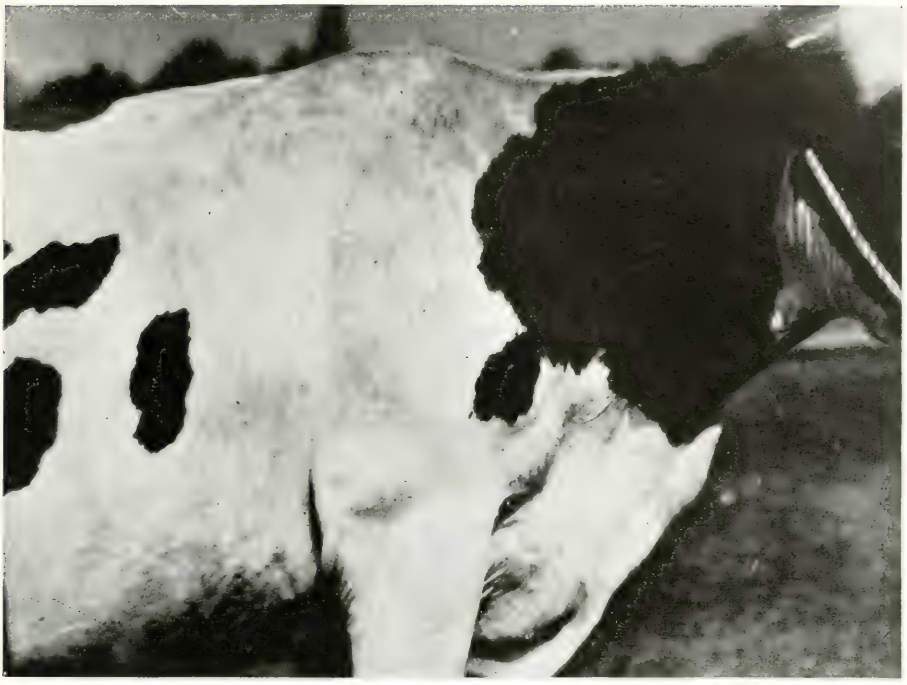


Toronto Municipal Abattoir (front view).

Toronto Municipal Abattoir. Interior. Cold storage on the left. Killing floors on the right.



Toronto Municipal Abattoir. Interior view of one of the private killing floors. Meat inspector of the H. of A. Branch on duty.

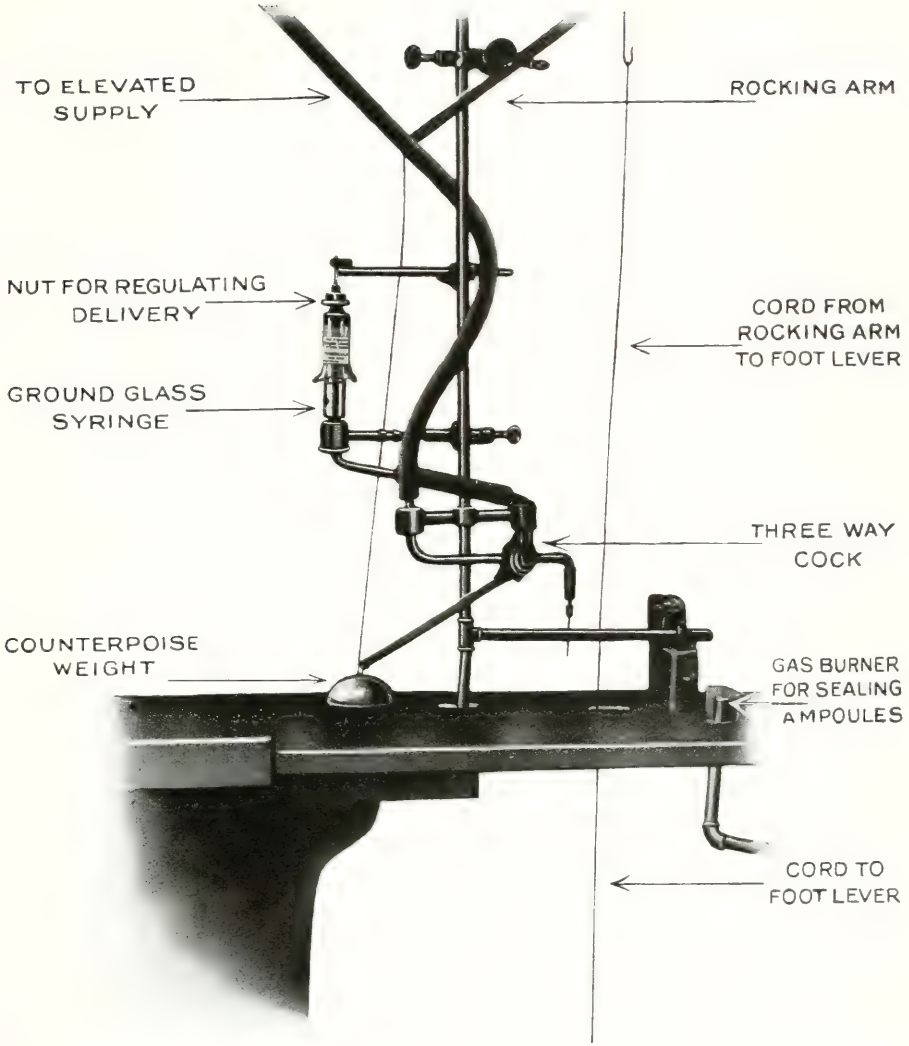


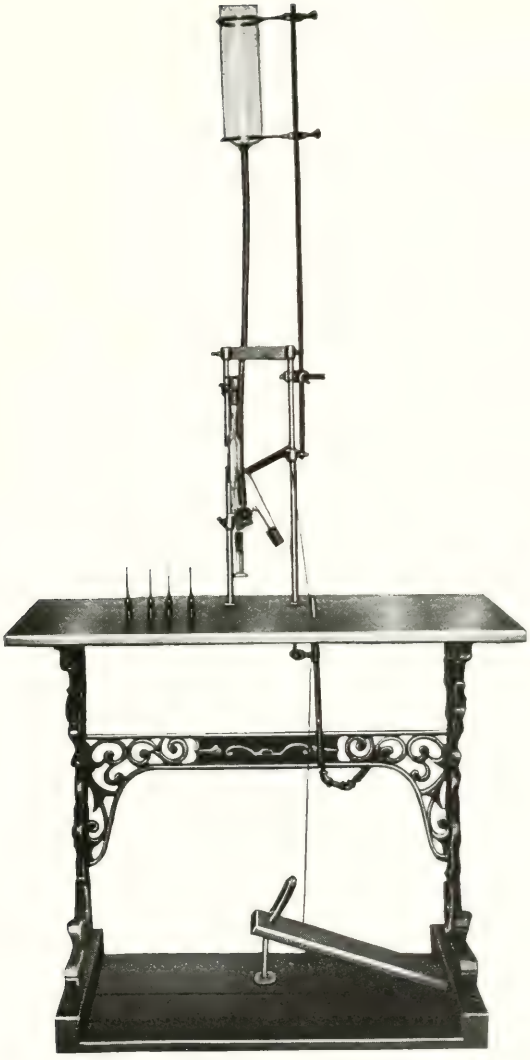
Follicular mange.

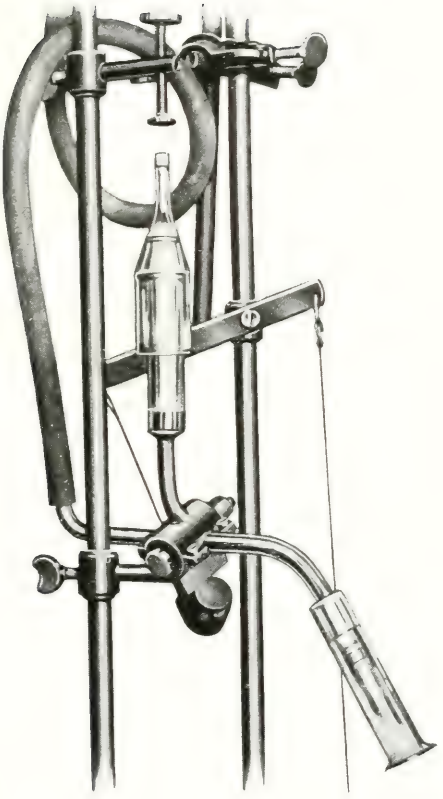
Follicular mange.

Photo Dr. Jarvis.

FIG. 1.—Hyperplasea of spleen.


TO ELEVATED SUPPLY
ROCKING ARM
NUT FOR REGULATING DELIVERY
CORD FROM ROCKING ARM TO FOOT LEVER
GROUND GLASS SYRINGE
THREE WAY COCK
COUNTERPOISE WEIGHT
GAS BURNER FOR SEALING AMPOULES
CORD TO FOOT LEVER





REPORT

ON THE

AGRICULTURAL INSTRUCTION ACT

1914-1915

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
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PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1916

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OTTAWA, December 31, 1915.

To the Honourable
MARTIN BURRELL,
Minister of Agriculture,
Ottawa.

SIR,—I have the honour to present my report on the work performed under the Agricultural Instruction Act for the year 1914-15.

The work is taken up in the following manner: First, a summary is given showing the chief purposes for which the funds hitherto made available by the Act have been expended in the various provinces of the Dominion; second, a review is presented, by provinces, of the work carried on during the past fiscal year. Financial statements are presented showing receipts and expenditure under (a) the Agricultural Aid Act (summary), and (b) the Agricultural Instruction Act (summary and detailed), to March 31, 1915.

A number of special reviews appear in the Appendix. These relate chiefly to the education of country boys and girls, and should be of value to those interested in the problems incidental to country life.

I have the honour to be, sir,

Your obedient servant,

C. C. JAMES,
Commissioner.

STATEMENT OF FEDERAL APPROPRIATIONS TO THE PROVINCES, UNDER THE AGRICULTURAL AID ACT, 1912, AND THE AGRICULTURAL INSTRUCTION ACT 1913-14, 1914-15 AND 1915-16.

——	1912–13.	1913–14.	1914–15.	1915–16.
	$ cts.	$ cts.	$ cts.	$ cts.
Prince Edward Island	6,529 85	26,529 85	27,832,81	29,138 28
Nova Scotia	34,288 45	54,288 45	61,144 45	68,001 87
New Brunswick	24,509 93	44,509 93	49,407 20	54,308 40
Quebec	139,482 40	159,482 40	187,409 16	215,310 70
Ontario	175,733 32	195,733 32	230,868 83	266,013 64
Manitoba	31,730 05	51,730 05	58,075 45	64,421 31
Saskatchewan	34,296 29	54,296 29	61,152 31	68,011 04
Alberta	26,094 95	46,094 95	51,310 41	56,528 82
British Columbia	27,334 76	47,334 76	52,799 38	58,265 94
Veterinary Colleges	.....	20,000 00	20,000 00	20,000 00
Total	500,000 00	700,000 00	800,000 00	900,000 00

DATES on which payments were made to the Provinces of the grants for 1914–15, and amount of payments.

Ontario	June 19,	1914	$115,434 41
	Nov. 26,	1914	115,434 41
Quebec	July 16,	1914	93,704 58
	Jan. 8,	1915	93,704 58
Alberta	July 3,	1914	25,655 20
	Nov. 7,	1914	25,655 21
New Brunswick	July 7,	1914	24,703 60
	Jan. 4,	1915	24,703 60
Prince Edward Island	July 11,	1914	13,916 40
	Jan. 12,	1915	6,000 00
	Jan. 30,	1915	7,916 41
Saskatchewan	July 7,	1914	30,576 15
	April 8,	1915	30,576 16
Nova Scotia	June 24,	1914	30,572 22
	Aug. 19,	1914	10,000 00
	Sept. 28,	1914	20,572 23
Manitoba	Aug. 10,	1914	29,037 72
	June 4,	1915	10,000 00
	June 11,	1915	19,037 73
British Columbia	June 30,	1914	26,399 69
	Jan. 4,	1915	10,000 00
	Jan. 30,	1915	16,399 69
Ontario Veterinary College	No payment		15,607 85
School of Veterinary Science, Montreal	Jan. 30,	1915	4,392 15
			$800,000 00

REPORT ON THE AGRICULTURAL INSTRUCTION ACT FOR THE YEAR 1914-15.

Tabled in pursuance of Section 8 of the above named Act.

GENERAL SURVEY.

Agricultural Instruction in Schools.

A study of the reviews presented in the Appendix makes it apparent that the movement to introduce the teaching of agriculture, manual training and home economics in schools in the United States is becoming very widespread, and that the intention is apparent to make these subjects an integral part of the general course of instruction in schools, rather than to provide special schools for specific subjects.

The question of efficient rural schools is one of the pressing problems of the day. Perhaps 95 per cent of the farm boys and girls receive in one-teacher schools the only schooling they ever obtain. That these schools are of very low efficiency is admitted by all who have given any thought to the subject. They are not equipped, and unless under some form of centralization, are not capable of being equipped in such a manner as to meet effectually the needs of present day rural life. Upon these schools must rest, therefore, much of the responsibility for ineffective farming, lack of ideals, and drift towards towns and cities.

It would seem that the problem is being solved in many states, first, by the Consolidated School, which makes industrial subjects and high-school work possible; and, second, by the introduction of special courses in the regular high school.

The case against the rural school is fully as strong in Canada as in the United States. The mental training given in such schools is inadequate. The special training, such as would enable the boy and girl to cope intelligently with and overcome the problems presented by rural life, is non-existent. The result is low achievement and discontent. The blame is placed on unfavourable economic conditions, whereas it is perhaps more often due to lack of the mental equipment necessary to take advantage of the scientific knowledge at the farmer's disposal or to enable him to hold his own as a force in industrial life.

A number of attempts are being made to overcome the deficiencies of the rural school. In Alberta, for example, excellent farm schools have been established, of which a somewhat extended account will be found in the section of the report relating to that province. In short courses for farmers and farmers' sons and daughters carried on by agricultural colleges and district representatives an attempt is seen to provide information that will help to render the community more efficient in life pursuits. It must be borne in mind, however, that education for citizenship is of far greater moment than instruction in the technical operations of crop production, important as those operations may be, and it would be unfortunate to imagine that the mental training the schools should have afforded can be made up by a few weeks at a short course.

In Canada, if the province of Manitoba be excepted, little has yet been done in the direction of school consolidation; even there agriculture is not in all cases being taught. Where consolidation has been effected in Canada, it would not appear that it has, in many instances, been developed to the point where the more important advantages of the system become available. Consolidation, to be truly successful, must go farther than the gathering together of a larger number of children under one roof; it must provide specialized instruction, secondary education and socializing influences for the whole community, for it is the lack of these that underlies many of the defects of rural life.

The funds made available by the Agricultural Instruction Act may be used to assist public schools to give instruction in agriculture, household economics and farm mechanics. All the provinces except Manitoba, Alberta and Saskatchewan have in some degree availed themselves of this aid. In the provinces of Ontario, British Columbia, Saskatchewan, Nova Scotia and New Brunswick, directors of elementary agricultural education have been appointed. Manitoba already had such an officer. The work undertaken up to the present time has been entirely of a preparatory nature, consisting of the training of teachers and the introduction of nature study and school gardening in the elementary schools. By what means instruction in the more advanced phases of such subjects is to be made generally available, is the problem now confronting the educational authorities, and it is apparent that, under the present one-teacher system of schools, its solution is not easy.

SUMMARY OF EXPENDITURE FOR EDUCATION IN AGRICULTURE AND DOMESTIC SCIENCE IN RURAL SCHOOLS, INCLUDING COURSES OF TRAINING FOR TEACHERS.

Ontario	$ 21,045
Quebec	19,843
Nova Scotia	14,873
New Brunswick	14,258
Prince Edward Island	11,998
Saskatchewan (Domestic science)	682
British Columbia	12,613
Total	$ 95,312

BUILDINGS AND EQUIPMENT.

In six provinces, Ontario, Quebec, Alberta, Nova Scotia, New Brunswick and Prince Edward Island, a portion of the Federal aid has been used to provide additional buildings or equipment, either in connection with, or independent of, the agricultural colleges.

Ontario: To meet the steadily growing demand for accommodation at the Agricultural College, there have been added a field husbandry building, a poultry building and a physics building (under construction); while funds were supplied for the completion of the dairy barns and for the re-construction of the bacteriological building. Building additions were also provided under the Agricultural Aid Act at the Eastern Ontario Live Stock Show, Ottawa, and at the Western Fair, London, and elsewhere. The total expenditure of Federal aid for building purposes until March 31, 1915, amounted to $195,818.

Quebec: The funds supplied under the Act have been of material assistance to the province of Quebec in providing increased accommodation and equipment for the Agricultural Institute at Oka and the School of Agriculture at Ste. Anne de la Pocatière. Oka has been provided with a new students' residence and improved class-

room and laboratory facilities, while at Ste. Anne de la Pocatière the college building has been enlarged to accommodate sixty pupils. The arrangement arrived at contemplates that each school shall be allowed $50,000 for building extension, and as is the case in New Brunswick and Nova Scotia, the cost of construction is financed locally, a certain sum being refunded each year from the grant. The sum paid to the Quebec schools under this head, up to the end of the fiscal year, amounted to $21,000.

Alberta: Each of the three Schools of Agriculture and Household Science, located on three of the provincial demonstration farms, were enabled to secure additional building equipment through Federal aid. These schools are essentially for farm boys and girls, and ninety-eight per cent of their students come directly from the farm. They have cost, independent of the farms, upwards of $50,000 each. Their equipment includes the main building, containing a chemical laboratory, dairy, and home economics room, and two smaller structures equipped for blacksmith and carpenter work and live stock judging. The two smaller buildings were provided by the grant, the sum of $18,380 having been used for this purpose.

The teaching staff comprises a professor of animal husbandry, and instructors in field husbandry, field mechanics, elementary science, home economics, and English. The managers of the farms, who are graduates of the Ontario Agricultural College, lecture on farm management and feeding, while the Superintendent of Demonstration Farms and other provincial officers supplement the work of the regular staff.

An insistent demand exists for more of these schools, and it is probable that within a few years the number will have increased to six or eight, giving instruction to an increasing number of pupils that will make them better farmers and better citizens.

Nova Scotia: Nova Scotia has been enabled by the funds placed at its disposal to enlarge the Agricultural College at Truro and to provide an entomological building and a science building. The latter, costing over one hundred thousand dollars, will be paid for in annual instalments. The Rural Science Training School, at which teachers are prepared for teaching agriculture, was equipped for the work. The grant has also contributed to the cost of providing buildings at five points in the province to be used for exhibition of live stock, instruction in seed selection, apple packing and other short courses, and as the headquarters of the district representative. Since Federal aid first became available, the sum of $55,230 has been expended in Nova Scotia for the above objects.

New Brunswick: Previous to the passing of the Act, the province of New Brunswick had no facilities of its own for education in agriculture. There being no agricultural college, students' fares were paid to institutions elsewhere, but the number benefiting was few. To help meet this deficiency, the Fisher Vocational School at Woodstock was, with Federal funds, equipped as an agricultural school. Later the school at Sussex was built and equipped by means of the grant, at an approximate cost of $33,000, the plan being to spread the expenditure over a number of years. This school was opened in the summer of 1915. It is proposed to add a third school at a later date.

The New Brunswick schools are similar, in a general way, to the Alberta schools, and designed with a similar object in view. When all are in operation, the young people in the sections served will have an opportunity of securing at their own door specialized instruction in agriculture and home economics.

In addition, two dairy schools were equipped from the grant, which also contributes to their maintenance, one at Sussex and the other at St. Hilaire, the latter meeting the needs of the French portion of the population. The total expenditure from the subsidy for these purposes was $30,750.

In Prince Edward Island, two buildings were purchased, one at Charlottetown, to which an extension was made, and one at Summerside. These are now equipped as halls for holding agricultural gatherings, courses in domestic science, in live stock judging, and other phases of agricultural instruction, providing in addition, at Summerside, quarters for the county representative. The total amount provided under the Act in this behalf was $12,275.

Expenditures for Buildings to March 31, 1915.

Ontario	$ 195,818
Quebec	21,000
Alberta	18,380
Nova Scotia	55,230
New Brunswick	30,750
Prince Edward Island	12,275
Total	$ 333,453

Colleges of Agriculture.

To enable agricultural colleges and similar institutions to strengthen their teaching staffs, to provide additional equipment, to assist them in carrying on the work of college extension, and to conduct investigations of a scientific nature in the various phases of agriculture upon which instructional work may be based, the Federal subsidy has been drawn upon in the provinces of Saskatchewan, Quebec, Nova Scotia and Prince Edward Island, during the three years as follows:—

Alberta—	
Schools of Agriculture (3)	$ 64,000
Saskatchewan—	
College of Agriculture, University of Saskatchewan	56,148
Quebec—	
Macdonald Agricultural College, Oka Agricultural Institute, School of Agriculture at Ste. Anne de la Pocatière, and other minor institutions	118,850
Nova Scotia—	
Nova Scotia Agricultural College	32,000
Prince Edward Island—	
Prince of Wales College	8,265
Total	$ 279,263

The above statement is exclusive of all capital expenditure. The Ontario Agricultural College and New Brunswick Schools are not given specific grants. Payments to members of the staff and other officers at these institutions appear under demonstrations and other lines of work.

Women's Work.

The organization of Women's Institutes, Home Economic Societies and Homemakers' Clubs has been greatly facilitated by the Federal subsidy. In Nova Scotia, Prince Edward Island and Alberta the initiation of the movement was due almost entirely to this assistance. In New Brunswick and British Columbia the work has been extended. In Quebec, Manitoba and Saskatchewan the extension departments of the agricultural colleges have been organized to include women's organizations. In Ontario, in 1914, the Director of Women's Institutes inaugurated demonstration lectures in domestic science in small groups of institutes, the instructors moving

from place to place on a schedule, as described in last year's report. This work was proceeded with during the present year. The Macdonald Institute at Guelph, in 1915, organized and carried out a very successful college extension short course in domestic science at Ayr, Ont., with the co-operation of the local institute. (See Appendix.)

The improvement of home conditions and the desire for mental stimulus and a wider social intercourse are the things that form the basis of the movement. A recognition of the needs of the home and of the child in the home brings with it a clearer recognition of the needs of the community and of the child in the school. "Trust a woman to be able to put her finger on the special reforms necessary to improve her community," writes one secretary, "and trust an organization of women to bring those reforms about." Therefore the more enthusiastic and progressive element are discerning in the institute a medium, not only for the betterment of home life, but for a general social uplift, recognizing what has been done as merely preparing the way for an even wider usefulness in the future.

The much needed social element that the institute introduces in the life of the woman on the farm comes as an inestimable benefit. The widened circle of acquaintance, the increased intimacy, the exchange of ideas, the inspiration and mental refreshment—all are results that flow from the hundreds of small groups of women meeting monthly under these auspices in practically all parts of the Dominion. In this respect the institute, where all find an equal place, occupies a unique position in the community.

Instruction in home economics, both for the young girls and the women of the farm, is supplied in the form of short courses to a greater or less extent in almost all the provinces, either through the extension department of the Provincial College of Agriculture or through the Women's Institutes.

In Quebec, a number of junior clubs have been formed, whose activities include not only home subjects, but gardening, bee-keeping and poultry raising. In Ontario, a disposition to form allied institutes for young girls is also noted.

Never since the days of the earliest pioneer settlement have the women of Canada so fully recognized their duty and realized their opportunity as during the present war. Their response to the call of the country, the Empire and humanity is beyond praise, and in that response the organized women of the farm have joined in a manner that is particularly notable for its devotion and self-sacrifice.

Summary of Women's Work Expenditure.

1912-15.

Ontario	$ 11,938
British Columbia	5,079
Manitoba	6,346
Nova Scotia	3,788
New Brunswick	8,685
Prince Edward Island	2,556
Total	$ 39,392

In Quebec, Manitoba and Saskatchewan work in connection with organizations for women forms part of Agricultural College extension departments, and the cost is not included in the above statement. In Alberta Women's Work is not assisted by the subsidy.

MEMBERSHIP.

	1913.	1914.	1915.
Ontario	22,042	23,698	28,927
Quebec	252	303	608
Manitoba	1,200	1,675	—
Saskatchewan	....	....	5,100
Alberta	1,200	1,400	—
British Columbia	1,905	2,802	2,682
Nova Scotia	384	1,041	1,351
New Brunswick	856	1,900	2,560
Prince Edward Island	400	750	690

DISTRICT REPRESENTATIVES.

Ontario: The district representative movement has had its greatest development in Ontario, where, nine years ago, six graduates of the Agricultural College were located in as many counties to act as resident agents of the Provincial Department of Agriculture. At the present time there are forty-one permanent county offices, besides a number of offices in Upper Ontario, which are open during the summer months. Most of the representatives have been given assistants and office help, and in many cases they have been provided with motor cars at the expense of the municipality to facilitate their work. The total working staff is now 135 persons.

In addition to salaries, it costs upwards of $3,000 a year for the maintenance of each office. To meet the necessary outlay, the province contributes $80,000 annually, and the expenditure of Federal aid, since 1912 to the end of the fiscal year, was $202,097.

The object of the movement is that of college extension in general, namely, to bring the results of investigation home to the farmer, and to give him individual and personal help in solving agricultural problems. It has been found, however, that a resident agent has many and varied opportunities for usefulness. Short courses, school fairs, junior farmers' improvement associations, acre-profit competitions, and farmers' organization come within his sphere of operation.

At the present time the leading features of the work of the representative are the short courses and the school fairs. Short courses of from four to six weeks' duration are held early in each year, and deal with animal husbandry, crops, soils, drainage, fruit-growing, weeds and insects, seed selection, poultry raising, dairying, veterinary science, and arithmetic and book-keeping, with special reference to the farm. In 1915 1,115 young men attended these courses. The acre-profit and similar competitions, and junior farmers' organizations are an outcome of the courses. The former have aroused great interest, 600 young men, representing 43 counties, having, in 1915, entered the acre-profit competitions alone.

The school-fair movement in Ontario has grown to such proportions as to require much time and attention on the part of the representatives, who have the general direction of the movement, assisted by the school teachers. In 1914 148 school fairs were held, involving the inspection of 23,872 home plots, and the distribution, besides seed, of 4,074 settings of eggs. In 1915 the number of fairs increased to 234. Further figures for 1915 are: Number of schools, 2,291; number of pupils, 48,386; number of settings of eggs, 6,868; number of children attending fairs, 72,860; adults, 84,406; number of entries, 116,236. For the best kept plots prizes are awarded, which involves at least two inspections.

The representatives are also active in many other undertakings, including variety tests, alfalfa demonstration plots, fertilizer tests, the promotion of seed-producing centres, farmers' clubs, breeders' clubs, and similar organizations, besides carrying on work in connection with soil surveys, drainage and other demonstrations, organizing meetings, and acting generally as leaders in the agricultural community.

Quebec: Quebec has located fourteen district representatives who perform somewhat similar functions to those in Ontario. Six "agronomists" with their assistants have been appointed by the Department of Agriculture, while eight "demonstrators" from the Macdonald Agricultural College have been located in English-speaking communities. It is reported that the work is beginning to make itself felt in the agriculture of the province.

Manitoba: A movement somewhat similar in conception was inaugurated in Manitoba in the spring of 1915. Five graduates of the Agricultural College were each assigned a district during the summer months. These men will act as agents of the department in extending the knowledge of good farming methods, and as inspectors under the Noxious Weeds Act.

Saskatchewan: In Saskatchewan also a movement has been made looking to the ultimate appointment of district representatives. The province has been divided into five districts, and a field agent appointed to each. Their duties include the supervision of the 45 agricultural secretaries and 730 weed inspectors appointed by the municipalities. The agricultural secretaries act as demonstrators in field husbandry and weed control. In the spring of the present year, four regular representatives were appointed.

Alberta: In Alberta the members of the staff of the schools of agriculture hold meetings and advise with the farmers in the territory adjacent to the schools, and thus perform a work similar, in some degree, to that of district representatives. Their salaries are charged to the grant.

British Columbia: A resident agriculturist has been stationed in the northern part of the province on the line of the Grand Trunk Pacific, to represent the department and to advise settlers now locating there, on matters relating to mixed farming.

Nova Scotia: Two appointments have been made, one for Cape Breton and one for Antigonish, and the areas under their supervision are greater in extent than where the county is made the unit of representation.

Prince Edward Island: In Prince Edward Island, a representative has been appointed in each of the three counties of the province.

Summary of Expenditure for District Representatives, 1912-15.

Ontario	$ 202,097
*Quebec	13,407
British Columbia	—
Nova Scotia	—
Prince Edward Island	6,166

*Not including Macdonald demonstrators. The expenditure in Saskatchewan for field agents is included with "Demonstrations."

Boys' and Girls' Clubs.

This movement had its origin in the United States, from whence it has spread in modified forms to different parts of Canada. Its purpose is to organize boys and girls of school age into clubs for contests in the growing of crops, in gardening, canning, bread-making, pig-feeding, calf-raising, poultry-growing and egg-laying. The work in the United States has been greatly facilitated through high and consolidated schools where agriculture and home economics are taught. In many instances it has reached a high stage of development. In the state of Minnesota alone, there are 700 regularly

organized clubs, with officers, constitutions and plans of work for carrying on some special club project, generous financial aid being given by State and county fair organizations, business men's associations, bankers, and others interested.

The objects of the movement as laid down by a leader in the work are:—

1. To interest boys and girls in farm life, and help them to realize the wonderful possibilities of the farm;
2. To teach them better methods in agriculture and home-making;
3. To connect the school and the home;
4. To establish thrift, industry and business habits;
5. To develop leadership in country life.

The great possibilities of the movement are self-evident. It increases the quantity and quality of production. The average yield of corn per acre in several states has been nearly doubled since the advent of these clubs, while in Canada it is shown that the improved seed distributed in this way soon becomes a source of farm seed supply, to say nothing of the improvement of poultry, where settings of eggs of a bred-to-lay strain are freely distributed, as in Ontario. Results of this kind help to make it apparent to boys and girls that farming is a paying business when knowledge and skill are brought to bear, that country life is full of interest, and that life at its best may be lived in the country home.

Other beneficial results of the work of the clubs are that it stimulates interest in ordinary school subjects, and opens the way for teaching agriculture and home economics.

In Ontario the forces through which work of this kind is carried on are the district representatives of the Agricultural Department and the rural school. During the past season, in that province, forty-five thousand boys and girls cultivated home plots of improved grains or potatoes, or raised chickens from the settings of eggs supplied, all these products being exhibited at a special school fair, in the holding of which the schools of a district combined. Extracts from the reports of district representatives in regard to the work are published in the Appendix, and make interesting reading. In the more advanced stages, such as pig-feeding, calf-raising and acre profit competitions, where reports in the work are called for, the junior farmers' associations of the province become operative.

In Manitoba, a splendid start has been made along similar lines, and this year there are being added competitions in bread-making, sewing, canning and preserving for girls and projects in farm mechanics for boys. Through the distribution of seed corn, a marked impetus has been given to fodder-corn growing. In 1914, 2,500 children from 100 schools exhibited at school fairs. Increased school attendance, renewed interest, and the establishing of a link between the school and the home are some of the results attributed to the work in that province, while the opinion is general that no movement has had a greater effect in arousing interest in better farming. The expenditure to date is $3,565.

In Quebec, New Brunswick and Nova Scotia, a beginning has been made by the distribution of seeds, plants or eggs, while in British Columbia junior competitions in potato-growing have been conducted under the auspices of the Farmers' Institutes. Arrangements are now being made in that province for club organization within the institute, and other crops will likely be taken up. The expenditure to date in British Columbia is $1,115. In Ontario and Quebec the cost of the work is met from the district representatives' appropriation, and in Nova Scotia and New Brunswick it is included with the cost of agricultural instruction in rural schools.

SHORT COURSES.

Ontario: Short courses in Ontario are held under several different auspices, namely, the Ontario Agricultural College and Macdonald Institute, the Department of Education, the District Representatives, the Farmers' and Women's Institutes; and the fairs and exhibitions, and vegetable specialists' branches of the department.

The Ontario Agricultural College each year holds short courses at that institution dealing with the leading phases of agriculture and horticulture, while the Macdonald Institute holds three short courses in domestic science. The cost of this work is provided for in the provincial appropriations.

The courses for young men held throughout the country by the district representatives have already been described under that head, and the outlay involved cannot be separately stated. These courses form a splendid recruiting ground for the Provincial Agricultural College, and, as they deal with young men in the formative period of life, they must be regarded as one of the most important agencies for the diffusion of agricultural instruction. Winners of acre-profit and live stock competitions conducted by the representatives, are given a short course free of expense at the Agricultural College.

Through the medium of the Farmers' Institutes, short courses of less than four days' duration, intended chiefly for the older members of the community, are held each year throughout the province, dealing chiefly with animal husbandry, illustrated by specimens of live stock from adjacent farms. In 1914-15, 77 such courses were held, with a total attendance of 23,000.

Since aid was received from the Federal grant, short courses in home economics for women and girls have been introduced through the Women's Institutes. There were held during the past year 39 such courses, of from two to four weeks' duration. They aim to give a systematic course in house-keeping, including food values and cooking, home nursing, etc.

The Fairs Branch of the Provincial Department sends out 300 judges each year to act as expert judges at fairs; and, to equip them properly and standardize their work, a short course is provided at the College at Guelph and at the Central Experimental Farm, Ottawa. Under the vegetable specialist of the department short courses were provided for vegetable growers at five points in the province. Under the Department of Education short courses are held at the Agricultural College for teachers who desire to qualify for teaching school gardening, nature study and agricultural science. All these courses, except the regular college short courses, are charged against the subsidy.

Quebec: In the province of Quebec, the Macdonald College holds short courses each year at the institution, dealing with agriculture and home economics. Courses are held also at outside points by members of the staff, the number of the latter in 1914-15 being 23, with an attendance of 3,351 persons.

At the Oka Agricultural Institute and the School of Agriculture at Ste. Anne de la Pocatière, short courses are held in general agriculture. A short course for farmers' sons was conducted by the District Agronomist at Henryville last year. The accounts do not show the cost of this branch of work in Quebec, it being met out of the allotment to agricultural colleges and schools.

In Manitoba, short courses are one of the forms of extension work carried on by the Provincial College of Agriculture. The Federal subsidy has not been called upon to assist the Manitoba Agricultural College in the work, but it is interesting to note that the short courses presented by that institution covered such subjects as gas and steam traction engineering, highway construction, creamery work, poultry-keeping. A short course for weed inspectors is held each year at the college for the purpose of qualifying these officers for the performance of their duties.

Under the auspices of the Home Economics Societies, which are given Federal assistance, two-day courses in house-keeping and three weeks' courses in dressmaking and millinery are conducted. As the work of organizing these societies is rapidly progressing, the number of courses for women is likely to be greatly extended. The attendance and keen interest manifested in all the above courses indicates a high appreciation of the work being carried on.

Saskatchewan: The Saskatchewan College of Agriculture holds a three weeks' course in farm engineering, a three weeks' course in home economics, and a farmers' general course of five days' duration. At the conventions for home-makers, agricultural societies and dairymen, lecture and demonstration courses are also held. At outside points (17 in 1914-15) the staff conduct lecture and demonstration courses in tillage, crops and animal husbandry and provide instruction for young men from the farms who attend the Regina and Moose Jaw Colleges, as well as for the teachers at the Regina and Saskatoon Normal Schools. At the Convention of the Saskatchewan Veterinary Association, lectures of instruction are given in veterinary science, for which the association receives an annual grant of $500 from the subsidy.

Nova Scotia: In Nova Scotia the Agricultural College at Truro conducts a two weeks' course in agriculture at that institution, besides holding courses at five outside points, at which buildings for the purpose have been provided partly from the Federal funds. Short vacation courses for the training of teachers in rural science are held each summer at the Agricultural College.

New Brunswick: At the Woodstock and Sussex Agricultural Schools in New Brunswick, and also at Newcastle, short courses in general agriculture are held which are successful in meeting, in part at least, the needs of the farming community. A summer school of rural science for teachers is held at Woodstock. Household science courses held under the auspices of the Women's Institutes, and charged to that appropriation, are held at Woodstock, Sussex and Chatham.

Prince Edward Island: The short courses comprised a course in household economics at Prince of Wales College, a course for teachers and inspectors in nature study and school gardening, teachers' summer school course, and courses for farmers in fruit-packing, cereal and animal husbandry and milk-testing.

British Columbia: In British Columbia in 1913-14 short courses in cooking and dressmaking were held under the auspices of the Women's Institutes, and a series of demonstration lectures in general farming and horticulture given through the Farmers' Institutes. In the following year a summer school in elementary agriculture and domestic science was held in Victoria to prepare teachers for giving instructions in these subjects. In 1914, 26 classes in pruning and 37 classes in grading and packing apples were held, and in that year 75 per cent of the British Columbia crop is estimated to have been packed by these schools.

Alberta: In Alberta summer schools for the training of teachers in agriculture, nature study, school gardening and household science have been held at Edmonton by the Department of Education during the past three years, instruction being given by the staff of the College of Agriculture. The work does not receive direct Federal aid. The attendance was as follows: 1913, 78 public school teachers; 1914, 155 teachers; and in 1915, 327 public school teachers and inspectors and 44 high school teachers.

In 1914, a special professional course was held at the Olds Agricultural School for members of the staffs of the Schools of Agriculture. The work of organization and instruction was assigned to the Director of Technical Education, Dr. James C. Miller. The principals of the schools and Normal School specialists gave series of lectures. Twelve were in attendance. This course, if continued, will doubtless prove of great advantage to the specialists and the schools.

SUMMARY OF SHORT COURSE EXPENDITURE, 1912-15.

Ontario	$ 25,874
Nova Scotia	2,661
New Brunswick	5,873
Prince Edward Island	5,776
Saskatchewan, weed control and veterinary	3,500
British Columbia	4,392
Total	$ 48,076

Note: The amount expended by district representatives in Ontario in connection with short courses is not included.

In Ontario, Manitoba and British Columbia short courses in domestic science are included under Women's Work. In Quebec, Saskatchewan and Alberta, short courses are included in college and school extension, and the specific expenditure cannot be given.

The expenditure on special courses to qualify teachers in agriculture and domestic science is included under Agriculture in Schools.

INSTRUCTION BY DEMONSTRATION.

The movement to reach all the farmers by actual demonstration is becoming the dominant note in instruction work at the present time in the United States. This form of instruction is specifically encouraged by the Smith-Lever Act. It contemplates putting into effect through demonstration by special agent on individual farms the teaching of modern agriculture in a more convincing way than can be accomplished through lectures, the distribution of reading matter, or similar methods. A review appears in the Appendix of what is being accomplished in the Southern States under this system, and also of the organization available for carrying into effect the provisions of the Smith-Lever Act in the state of Oklahoma.

Instruction Trains: Lectures and demonstrations by means of instruction trains is one of the most striking methods of agricultural college extension. Hundreds of young people in the remoter districts, who never had a chance to see the inside of an agricultural college, and who never received any technical or scientific training in their business, are in this way brought into contact with the work being carried on in these institutions and with the men who are engaged in it. The incentive thus given to learn about improved systems and methods is a valuable outcome.

"Better Farming Specials" traversed three of the provinces in 1914—Manitoba (two), Saskatchewan, and New Brunswick. In Quebec all preparations had been made, but the plans were cancelled at the request of the railway owing to the transportation of troops. The funds for fitting out and running these trains were provided under the Act. In Quebec, Manitoba, and New Brunswick in 1913 and 1914, and in Alberta in 1913, similar trains were operated.

The railway companies facilitated the work in every possible way, and their assistance should receive recognition. In the West the trains, comprising an engine and twelve cars, with operating crews, were furnished free of charge, the Government paying at the rate of one dollar per meal for each member of the lecturing staff.

The material for the lecture work carried in one or other of the trains dealt with almost the entire range of agricultural instruction, embracing live stock, poultry, dairying, equipment, beekeeping, seed selection, plant diseases, drainage, weed eradication, home economics, and farm mechanics.

On one train a carload of dairy cattle was carried; on another a car each of hogs and sheep, and talks were given on their economic feeding and management. The possibilities of improvement through the continued use of pure bred sires were demonstrated by pens of scrubby range ewes and the products of the first and second crosses in comparison. These demonstrations from living models were particularly interesting to the public.

Among the new features were motion pictures, in a darkened coach, dealing with egg and seed germination and plant and insect life. The killing and preparation of poultry for market was handled on one train, and others were equipped with information bureaus, where consultation on farm problems was invited and printed matter distributed. In the women's car the demonstrations of household conveniences were very popular. The attendance in Manitoba for one train alone was 34,000, while the Saskatchewan train attracted no less than 36,000 persons.

Ontario: In conducting farm demonstrations in Ontario the district representative largely assists, working to this end in co-operation with the Agricultural College and the department. He arranges for demonstration plots of corn and alfalfa on the individual farms, assists with soil surveys and drainage plots, etc., and organizes the public meetings connected therewith. To demonstrate the benefits of drainage in sections where the same are not generally recognized, 17 plots are being conducted. The first report on those started previous to 1914 shows an average increase of nearly 15 per cent in crop values. A traction ditcher has been operated by the department for several years. In 1914 1,673 miles of drain were laid and 23 public demonstrations held in connection therewith. The work on soils contemplates illustrating through plots, located on depleted land, the methods to be followed in restoring fertility.

In connection with fruit growing, the district representatives conduct demonstrations in pruning, spraying and cultural methods in privately-owned orchards, and undertake certain experiments in orchards leased for a term of years. Packing demonstrations and horticultural demonstration bureaus are conducted at the leading fairs, and instruction in fruit packing is given at the horticultural courses at the Agricultural College.

Demonstrations and lectures in live stock, poultry, beekeeping, and horticultural work are carried on as part of the extension work of the Agricultural College, through institutes and other gatherings. In this connection several additions to the college staff have been made. Demonstrations in the treatment of diseases and pests affecting vegetables are conducted through the department. The charges against the subsidy since 1912 amount to $44,900, exclusive of disbursements by district representatives.

Quebec: Two ditching machines were purchased in 1912, and an active campaign entered upon to demonstrate underdrainage. Plans were supplied, and the Government undertook to remit to farmers who drained ten acres of land half the cost of the work. Nearly 56,000 feet of drain were excavated in 1914-15.

Thirty-five poultry plants have been established throughout the province. The majority of these are fattening stations, which have, for the most part, been operated on a self-sustaining basis, but there are a number, under the supervision of the district representatives or specialists, where housing and marketing are made the leading features. At the six demonstration houses established by Macdonald College, breeding flocks are maintained and eggs distributed for school-fair and other work.

In 1913 and 1914 demonstration trains were operated, the Agricultural College and the Schools of Agriculture rendering assistance.

Demonstration plots in alfalfa and clover have been located in different sections of the province; seed has been distributed to farmers through the Experimental Union, and investigation and experiment carried on at the College and Schools of Agriculture. It has been found that the hardy varieties of alfalfa do well in the district of Montreal, and in a few of the eastern counties. In the northeastern part of the province, results have hitherto been unsatisfactory.

In connection with dairying, instruction is given to operators and patrons of cheese and butter factories through the department's staff of inspectors, as is also the case in regard to beekeeping. Demonstrations were given in the culture and curing of tobacco, and for the latter a special barn has been provided. To demonstrate bacon curing a Danish expert is regularly employed, and a co-operative abbatoir has been

built with funds supplied by the Act. A school is now being operated in connection with the plant at which men are being equipped for managing co-operative bacon plants now being formed. The province, being situated in the centre of the maple-growing zone, produces a large quantity of sugar and syrup. In order to develop this natural industry and to improve the quality of the products, three maple-sugar making schools have been established, where instruction is given in the best methods of making and marketing. The charge to date of equipping and maintaining these schools is $6,337.

To develop a home supply of clover seed, two demonstration hullers were sent out by the department. Hundreds of bushels of good clover seed were taken from common hay without any special preparation. The farmers who witnessed the demonstrations began at once to grow clover for seed. Prizes were given, and this year thousands of pounds are offered for sale. As a result of this work the Quebec Seed Growers Co-operative Association at Ste. Rosalie, for dealing in all classes of registered seed, has been formed, and in addition, many small societies have been organized to handle the clover seed of their members.

In these departments of work the total charge against the subsidy since 1912 amounted to $169,990 at the end of the fiscal year.

Fruit growing has been greatly stimulated in Quebec by Federal aid, and the province will, it is anticipated, eventually become one of the leading fruit centres of Canada. Forty-five orchards, comprising 118 acres are being operated by the provincial fruits branch to demonstrate approved methods of culture. The department supplies materials and equipment, and pays for labour and supervision. In the eastern part of the province, where the climate is more severe, tests of hardy varieties are being conducted at four points. The Macdonald Agricultural College has also planted apple orchards at two points, which are under the management of the college demonstrators.

In 1914, an expert was employed to demonstrate the manufacture of preserves at the French Schools of Agriculture. The expenditure on fruit work since aid was first extended amounts to $58,370. This includes not only the expenditure on orchards, demonstrations and lectures (exclusive of Macdonald College), but also for bulletins, exhibition work, and the salaries of the officers of the fruits branch, including the Provincial Entomologist.

Manitoba: In this province fifteen farms, each of about 40 acres in extent, are being established for the purpose of demonstrating the results obtainable from scientific farming. Fourteen of these farms are leased for a period of twelve years, but the farm at Killarney, intended to demonstrate fruit growing, was purchased. The farms are operated by their owners, the department supplying labour, materials, fencing, equipment, and, when necessary, special seed, besides directing the work. In connection with the farms, 20 demonstration plots of alfalfa have been established. The charges against the grant in the past three years in connection with the farms amounted to $16,155.

Through the extension department of the Manitoba Agricultural College, demonstration and instruction for farmers is provided, independent of the work done by the demonstration trains, which were operated in 1913, 1914 and 1915. The poultry department conducts demonstrations in the feeding, killing and dressing of poultry, and holds competitions for which premiums are awarded. Instruction is given in beekeeping through the Provincial Apiarist, who is located at that institution, and members of the college staff lecture and demonstrate in field and animal husbandry. Instruction is given by the department among the foreign-born population in outlying districts in dairying methods and in vegetable growing. For the above work, including an investigation in underdrainage conducted at the college, $20,722 has been charged against the grant since 1912.

Saskatchewan: Travelling instructors in livestock, dairying and field husbandry, operated in Saskatchewan to carry knowledge of up-to-date methods to the farmers. Poultry fattening and marketing is demonstrated at the Government-operated creameries (over 3,000 patrons in 1914), by an instructor from the College of Agriculture. Cow-testing demonstrations and competitions are conducted through the same channel by the dairy branch. This branch also operates demonstration dairy cars apart from the regular "Better Farming Specials." In the winter of 1914-15, meetings were held at 39 places by this means. Field representatives demonstrate better methods of field husbandry and weed control. Since 1912, $59,555 has been charged to the grant to cover the cost of lectures and demonstrations, competitions, better farming trains and instruction work generally.

The great progress of Saskatchewan as a dairy province during the past few years is due, not only to education in methods of production, but also to a recognition of the fact that the purely commercial side of the business is of equal importance. Large sums are advanced annually by the province to facilitate the financing of the business.

Alberta: The Provincial Demonstration Farms and Farm Schools form the centre from which the work of demonstration is carried on in connection with the live stock and dairy industries. In 1912-13 and 1913-14 a portion of the grant ($17,690) was employed for the purchase of beef and dairy cattle for distribution among the seven farms, with the result that the surrounding districts are becoming centres for the breeds represented at the respective farms—Holsteins, Ayrshires or Shorthorns, as the case may be.

Through the medium of the schools, the dairy branch of the Provincial Department has performed a large amount of work in the testing of dairy herds. Live stock is given as prizes, and the herds, not only of adjacent farms, but also of all ex-students, are eligible. Great interest has been shown in the work, the cost of which, including the salary of the Superintendent of Dairy Instruction and his assistants, is borne entirely by the grant. For all forms of demonstration and the competitions connected therewith; also purchase of cattle, and the running of a "better farming" train in 1913, the sum of $32,160 has been charged to the subsidy.

British Columbia: British Columbia regards demonstration work as one of the best means of educating the farmer in modern agricultural methods, and devotes a large portion of the Federal grant to work that comes within that general classification. Conditions of soil and climate vary exceedingly, and for this reason small demonstration plots, rather than experimental farms, are being emphasized. The department leases the land under a nominal rental and pays for the work performed. The object is not only to demonstrate but to experiment.

In connection with fruit growing, work has been proceeding for fifteen years and much information has been collected. Two systems are pursued (1) demonstrations in old orchards, (2) demonstration orchards leased for a period of five years and operated under government supervision. Of the latter there are sixteen, each of about five acres in extent. All orchards are used to illustrate to gatherings of fruit growers methods of spraying, pruning, fertilization and culture. A number of demonstration plots for small fruits and vegetables have been organized both in the north and south to demonstrate cultural methods and to test varieties, and investigations are being undertaken in connection with storage and transportation. Several instructors have been added to the staff to assist the work.

Ten alfalfa plots and eight investigation plots are being operated, and twelve more are being made ready in different parts of the province. Six of these will be located in the northern part of the province, where there is great need of instructional work among the new settlers.

Some twenty-five demonstration poultry plants have been established and supplied with suitable stock; egg laying competitions are organized, and the educational work carried on is doing much to encourage the industry. Bee-keeping is allied to fruit growing. No foul brood exists in the province, but the management of bees differs somewhat under the varying climatic conditions, and instruction is given to the apiarist by personal visit.

Co-operative tests and competitions in the growing of alfalfa, corn and other crops are carried out through the medium of the Farmers' Institutes, the experimenters being required to report on results. One ton of Grimm alfalfa at 10 cents per pound, half a ton of seed corn (free) and two thousand bushels of registered Banner oats, at cost, were last year distributed in this way, the department paying the freight. Hundreds of co-operative tests resulted. Many sections of the province are eminently suited to alfalfa, and it is hoped that seed distribution and demonstration plots will result in the widespread cultivation of this valuable crop.

Two small demonstration outfits were purchased and a campaign begun in the construction and use of silos. In the west coast districts and on Vancouver Island, the use of clover and grasses as sweet silage is being advocated.

Through the Farmers' Institutes—95 in number, with a membership of over 8,000—a large amount of lecture and demonstration work is performed in regard to horticulture, field crops, weed suppression, co-operative marketing, and the purchase of supplies. Travelling instructors visit the dairy farms and creameries of the province and interest owners in the work of recording the milk production of their herds. Associations are organized, and the testing work is carried on by competent men sent out by the department and provided with the necessary equipment. Since 1912, $63,142 has been expended from the federal grant in these activities.

Nova Scotia: The demonstration work in connection with apple culture is undertaken (1) in connection with provincial model orchards, 36 in number, and (2) the renovation of neglected orchards. For this latter class of work, private orchards located in various parts of the province are employed to demonstrate the results of approved methods of treatment, this being followed by orchard meetings. The renovation work was financed from the Federal grant.

Nova Scotia demonstrates underdrainage through the operation of two traction ditchers purchased from provincial funds, and one cement tile-making machine purchased from the Federal grant. The College makes free drainage surveys and the ditching work is performed at a reasonable charge. The tile-making demonstrations were undertaken on account of the difficulty in obtaining commercial tile. On account of the value of turnips to the live-stock industry, plots to demonstrate their culture are conducted, and prizes given for results. A number of demonstrations are carried on with ground limestone and fertilizers. In connection with the poultry industry, model poultry houses have been located at numerous points, and an active campaign is being carried on by demonstrations at exhibitions and elsewhere and through egg circles. A large amount of demonstration work is performed through cheese factories and creameries and meetings of patrons. The total expenses charged to the grant under these heads amounted to $22,168 in the two years.

New Brunswick: Practically the entire field staff of the department—16 in number—assisted by the teachers in the agricultural schools and special instructors, undertake through visits to individual farmers, meetings and lectures, to demonstrate methods in dairying, poultry and animal husbandry, horticulture and bee-keeping. Special attention has been given to the treatment of potato diseases. Demonstrations in underdrainage by means of a traction ditcher, purchased by means of the grant, have been held for two years. This year demonstrations in the crushing of limestone rock have been added, meetings of farmers being held in connection with both these undertakings.

To promote apple-orcharding, established orchards are taken over for a term of years and operated on a commercial basis to demonstrate processes of renovation and proper cultural methods, the cost being charged to provincial appropriations. The total expenditure charged against the grant during the two years for work of this nature, including instruction trains, amounted to $37,649.

Prince Edward Island: Demonstrations in sheep-dipping and in poultry raising, in the care of orchards, and in the grading and packing of apples, have been widely held during the past two years. One of the results is seen in connection with the organization of egg circles throughout the province. The amount charged against the Federal grant since 1912 for work of this kind amounts to $3,643.

SUMMARY OF EXPENDITURE for Demonstration and Instruction, 1912-15.

Ontario	$ 44,900
Quebec	228,360
Manitoba	50,538
Saskatchewan	59,555
Alberta	32,160
British Columbia	63,143
Nova Scotia	22,168
New Brunswick	41,048
Prince Edward Island	3,643
Total	$ 545,515

ONTARIO.

The subsidy provided under the Agricultural Instruction Act in 1914-15 and its allotment:—

District Representatives	$ 100,000 00
O. A. C. Short Courses, travelling and living expenses of winners of acre profit and live stock competitions	1,500 00
To encourage agriculture in the public and high schools, to be available for grants and for travelling and living expenses of teachers and others in attendance at short courses or other educational gatherings, in addition to services, expenses and equipment, and to be paid out on recommendation of the Department of Education	13,000 00
Educational work in connection with marketing of farm products, including organization of co-operative societies, collection, printing and distribution of information on current prices and systems of marketing	1,000 00
Building at Ontario Agricultural College, including completion of buildings under construction	72,000 00
Stock and seed judging short courses and institute lecture work	7,500 00
Women's Institute work, including courses in cooking, sewing, etc.	7,500 00
Short courses for fall fair and field crop judges, including travelling and living expenses	1,500 00
Drainage work	4,000 00
Demonstrations and instruction in vegetable growing	2,500 00
Demonstration work on soils	5,000 00
Demonstration work in spraying, pruning and packing of fruit	7,500 00
Demonstrations and instruction in live stock and poultry	4,500 00
Work in bee-keeping	1,000 00
Lectures on horticulture	500 00
Miscellaneous	1,868 83
Total	$ 230,868 83

Outline of Work Performed

In the case of Ontario, a line cannot be clearly drawn between the work financed by the province and that for which funds are provided under the Agricultural Instruction Act. Except in a few instances the Federal grant supplements the grants made by the Provincial Legislature. In some provinces the work financed by the Federal subsidy is kept distinct and separate from that regularly carried on, but in Ontario and in most of the other provinces, this is not the case. The exceptions in Ontario are: (1) Educational work in connection with the marketing of farm products, and (2) Demonstrations and instruction in vegetable growing. These are new branches and are financed entirely out of the Federal grant.

District Representatives.

The district representative movement begun in 1907 now embraces practically the whole province, 41 offices having been established in addition to temporary summer offices in the districts of Muskoka and Sudbury. The working staff, including representatives, assistant representatives (of which there are two in some of the larger counties) and office help comprises 135 persons. In many cases, motor cars have been provided out of the county grant. The cost of the work is met out of the Instruction Act subsidy, supplemented by an annual appropriation of about $80,000 by the province, and by county grants.

The winter short courses in agriculture, and the developments that are an outcome of them, together with the management of school fairs, constitute the most impressive lines of activity.

Each year brings an added interest in the courses in agriculture. This is indicated by the increase in attendance, and the growing demand for these courses. In 1914, 30 courses were held with an attendance of 555, while the attendance in 1915 was 1,115. The courses last from four to six weeks. Experience has demonstrated the wisdom of holding the courses in a different section of a county each year. In the majority of cases, the town hall or some large room is rented and equipped temporarily for the work.

The following will serve to indicate the varied and practical nature of the courses:—

Live Stock.—History and Characteristics of breeds of Horses, Cattle, Sheep and Swine; Records and Pedigrees; Judging—including visits to local Stock Farms; Use of the Score Card; Feeding and Management; Construction of Farm Buildings.

Farm Crops.—Varieties of Farm Crops; Methods of Crop Improvement; Seed Selection; Judging Grain; Rotation of Crops; Special Study of Corn and Alfalfa.

Soils.—Classification of Soils; Food Requirements; Fertilizers; Methods of Cultivation; Underdrainage.

Fruit Growing.—Location of Orchards; Nursery Stock; Planting; Pruning with Practice in Orchards in the vicinity; Spraying; Making up Solutions; Cover Crops; Picking and Marketing Fruit; Box and Barrel Packing; Small Fruits; The Farmer's Garden.

Weeds and Insects: Characteristics and Methods of Combating these pests.

Poultry: Breed, Management, Housing, Feeding, Hatching and Rearing, Crate Fattening.

Veterinary Science: Causes, Symptoms and Treatment of Common Ailments of Farm Animals.

Dairying: Types of Milk Cows, Feeding for Milk Production, Milk Records; the Babcock Test.

Bacteriology: Study of Bacteria in Soil, Milk, Water, Silage, Bacterial Diseases.

Special Work: Farm Arithmetic and Book-keeping, Public Speaking, Debates and Literary Work.

Special attention is always given to those subjects that are considered of the most importance locally. At all times an effort is made to have the courses practical—demonstration is used as much as possible. Where it is desired to teach the characteristics of breeds and types of live-stock, the students are taken to the farms of breeders of pure-bred stock. Likewise, when receiving instruction in pruning fruit trees, the class is taken to a nearby orchard where trees are pruned by experts.

A feature of the courses probably even more important, is the practice of the District Representative taking his class to Toronto, Guelph, or Ottawa, where they have an opportunity of inspecting and judging classes of stock that could not be secured in their own district. In addition, stockyards and abattoirs are visited.

In 1915, a two weeks' course for farmers' daughters was held in several counties at the same time as the men's courses. Household science subjects were taught, including sewing and poultry work.

Junior Farmers' Associations: The Junior Farmers' Improvement Associations, with several branches in each county, were organized by the district representatives with a view of keeping in touch with the young men who take the courses, and thus continuing the work begun. The movement promises to become an important factor in moulding the agriculture of the province. Two meetings are held in the representative's office, one in the spring and another in the fall, to discuss plans and results. In addition, monthly local meetings are held.

The activities of this organization include acre profit and hog and calf-feeding competitions, cow recording, experiments with alfalfa and other crops, and variety tests. These undertakings are not confined to the members of the organization, however, but may, in most cases, be engaged in by all who take the short courses.

In 1914, 198 young men competed in the acre-profit competitions and 85 in the hog-feeding competitions. In 1915 the number taking part in the acre-profit competitions increased to 600 representing 43 counties. Contestants are required to make a report showing conditions and methods. The winners in each county are given a two-weeks' free course in stock and seed judging at the Agricultural College. These contests have aroused more interest than anything of the kind ever undertaken in the province. 25 winners in the 1913 competitions and 68 winners in the 1914 competitions were given short courses at the Agricultural College.

In each county, in 1915, a team of three young men was selected from among the short course men to compete in a contest in judging live-stock and horses at the Guelph or Ottawa Winter Fair. The prizes will consist of trophies, medals and cash.

The School Fair Movement: The popularity and extension of the School Fair movement continues, and calls for a great deal of time and attention on the part of both the representatives and teachers. In 1914 there were 148 fairs held in 37 counties, including the children of 1,391 schools. There were 75,602 entries and a total attendance, including children and adults, of 95,310. The number of plots cared for by the children on their home farms and inspected by the district representatives was 23,872. 4,074 settings of eggs of the bred-to-lay strain of Barred Rocks were distributed, in addition to sufficient seed of the very best varieties obtainable to plant the plots.

These fairs, as the name implies, are exclusively for children, and have no connection with the adult organizations. The crops grown and the chickens raised form the chief basis of the exhibits. Instructions accompany the supplies. Two visits from the representative are called for in order that advice and direction may be given. Prizes are given for the best plots. In 1915, 235 school fairs will be held, and in one county alone there are 3,000 plots under supervision.

In addition to training the child in growing crops and in business methods, it is found that the rest of the family become interested and share in the benefits. Many parents save the produce of the plots and soon have sufficient seed of a good strain for their own requirements. The inspections also enable the representatives to make the parents' acquaintance, and to give assistance and advice where needed.

Other Lines of Work: Among other lines of work conducted by the representatives the following may be briefly noted:—

1. Variety tests of corn for silage: These tests are being extended to cover practically every county.
2. Alfalfa tests: These were begun three years ago to demonstrate the importance of using hardy strains, and to provide a source of seed supply. In no case was failure reported with the Grimm and the Ontario Variegated strains. For seed production the drill method is proving most satisfactory.
3. Fertilizer tests: These require to be followed up for several years, as results with certain forms of fertilizers are scarcely apparent in the year of application.
4. Promoting seed centres for the production of seed of improved quality under regulation by the Canadian Seed Growers' Association.
5. Promoting the organization of farmers' clubs, breeders' clubs, county boards of agriculture, etc.
6. The compilation of a census of pure-bred stock, and of a breeders' directory.
7. Furthering the movement for forest planting, soil survey, drainage and co-operative undertakings.
8. Conducting orchard demonstrations under the supervision of the Fruits Branch.

Short Courses.

Short courses have become firmly established in Ontario as being one of the most effective means of carrying on agricultural college extension work. The series held

by the district representatives is one of the most important and has already been referred to. These courses do not appear to have detracted from those held regularly in the early months of each year at the Ontario Agricultural College, as the following statement will show:—

Nature of Course. O. A. College.	No. in attendance. 1914.	1913.
Stock and seed judging	158	189
Fruit growing and apple packing	114	104
Poultry course	40	30
Dairy courses	86	37
Apiculture	87	60
	485	420
Domestic Science short courses, Macdonald Institute	78	72
	563	492

Particulars as to the short courses held at the college for training teachers will be found in the paragraph relating to elementary agricultural instruction.

These courses range in length from two weeks to three months, being for the most part from two to three weeks. No fee is charged, and the only expense is for travelling and for board, which in some instances is met out of the Federal grant.

It will be noticed that the above includes the short courses in domestic science given at Macdonald Institute. Of these there are three per year of three months each, and they are very popular, there being always a considerable waiting list.

During the past two or three years courses in domestic science have been introduced through the Women's Institute, and have proven most popular. During the past year thirty-nine of these courses were held, and attracted an attendance of 1,300. The aim is to give a systematic course in food values and cooking, sewing and home nursing. The courses range from two to four weeks, instruction being given every day for four or five days a week. Some attention is frequently devoted to dairy work and poultry matters, which are also of great interest to women.

The courses held under the auspices of the Farmers' Institutes are of about two days' duration, and deal with live-stock and seed judging. During the past year seventy-two such courses were held. Occasionally a meeting of a somewhat general nature occupies the evening session.

During the winter of 1914-15, a new series of courses was held by the vegetable specialist of the department, whose work comes exclusively under the Agricultural Instruction Act. These courses or conferences were held near the cities, and were attended chiefly by market gardeners.

The department sends out upwards of three hundred judges each year to judge in the field crop competitions, and in the various classes at the fall fairs, especially live-stock. In order to secure as great a uniformity of standard as possible, it was thought desirable to hold a short course for these judges, and consequently those in Western Ontario meet at the Agricultural College at Guelph for two days early in July, and those from the eastern section of the province meet at the Central Experimental Farm at Ottawa. At both these institutions practical addresses and demonstrations are given, so that judges may fix in their minds the standard for which to look when they are judging a field of oats and barley, or when they go into the ring and endeavour to size up any of the various classes of live-stock. The courses have undoubtedly been instrumental in securing a better class of judges.

Elementary Agriculture.

The place of agriculture in the courses of study in Ontario primary and secondary schools is at present under consideration by the department, with a view to complete reorganization.

The work being carried on was dealt with at some length in the report of 1913-14, and has been continued in a manner similar to that therein described for the period covered by this report.

The trained teacher is considered to be the prime necessity for the sound establishment of any permanent scheme of agricultural teaching. To this end the following courses were held at the Ontario Agricultural College in the summer of 1914:—

1. Normal Teachers Class in Elementary Agriculture, between April 20 and June 26. Teachers attended and were awarded certificates in Elementary Agriculture and Horticulture by the Department of Education.

2. Summer School for Public School Teachers, between July 2 and August 7, with an attendance of 64 in the first year's class and 32 in the second year's class. All the teachers completing the two summer courses become eligible for the Elementary certificates in Agriculture and Horticulture, and when they carry out the agricultural work for rural and village schools, obtain special grants from the Department of Education.

3. Summer School for High School Science Teachers, July 2 to August 7. Sixteen teachers attended the first year's class and thirteen the second year's class. The teachers completing the two summer courses successfully are eligible for the Intermediate Certificate in Agriculture and Horticulture awarded by the Department of Education, and obtain special grants when they carry out the prescribed agricultural courses in the High Schools.

4. The First Rural Teachers' Conference, from August 2 to 7. This was attended by about 125 delegates from Teachers' Associations of the province. Two rural teachers represented most of the associations. Their travelling expenses were met out of the appropriations from the Federal funds. At the fall conventions of the associations they reported to their fellow teachers and discussed Ontario's rural problems in their relationship with the schools. In the opinion of the delegates, the chief hindrance to the progress of the work was the lack of informed public opinion. Many delegates have been carrying on successful propaganda through their local press and by addressing Women's Institutes, trustees' meetings, etc.

In 1913, 177 village and rural schools entered for agricultural teaching and 159 qualified for special grants. In 1914, 278 schools were entered. On account of the increased number, the field agents were increased from 6 in 1913 to 8 in 1914. These young men selected from experienced rural teachers attending the Agricultural College, visited all schools entered for the work, assisted the teachers and conferred with trustees and ratepayers. In their endeavours to promote agricultural teaching they visited schools where its introduction seemed likely, and spoke at Women's Institutes and Farmers' Clubs. They also helped in the organization of school fairs, teachers' organizations, taught in the summer model schools and in a few places held summer short courses for pupils in groups of rural schools.

The number of high and continuation schools introducing agriculture increased from 2 in 1913 to 13 in 1914.

Co-operation and Marketing.

In January, 1914, the Co-operation and Markets Branch of the department was organized. The work during the year consisted mainly of investigation as to marketing organizations, and other co-operative enterprises, such as creameries and cheese factories, rural telephone companies, etc. Assistance and advice were given where new organizations were being started.

A book-keeping system for associations is being devised and the question of rural credit dealt with. Municipal markets, their value, operation and use, are also receiving attention. Nearly every town in Ontario is equipped with a farmers' open market. The value of these markets in bringing producer and consumer together is undoubted, but they might be made a more effective factor than they are at present.

Considerable work remains to be done in the various fields of activity before definite statements can be made.

Buildings at Ontario Agricultural College.

The additional buildings constructed at the college with the funds provided under the Agricultural Aid Act and the Agricultural Instruction Act were as follows:

Field husbandry building, poultry building, dairy barn (to complete), bacteriological building (reconstruction), physics building (started).

The appropriations were: 1912-13, $40,000; 1913-14, $56,500; 1914-15, $72,000. Total, $168,500. The expenditure of March 31, 1915, was $147,895.52, leaving a balance of $20.604.48 to be added to the appropriation of 1915-16 for similar purposes.

Women's Institutes.

There is no question that Women's Institutes, with 850 branches and 23,700 members, form one of the strongest factors for rural betterment in the province of Ontario.

The demonstration lecture course in sewing, food values and cooking were continued during the year with a total attendance of 15,500, to the end of October, 1914. At these courses systematic instruction, embracing from ten to fifteen lessons on a definite line, is very much appreciated by the women of the rural districts, who had previous to the past two years only isolated lectures and demonstrations upon those subjects. The aim of the department is to make it possible for the girls and women of the rural district to be given at least a brief course of instruction in the subjects that relate to the everyday activities of the home.

The appeal for assistance for Red Cross and Belgian relief met with a most liberal response. By the spring of 1915, over $40,000 had been collected in cash, and large quantities of clothing and hospital supplies donated.

Drainage Work.

The new feature of the drainage work carried on under the Professor of Physics has been the demonstration plots. These, it will be recalled, were started in sections where the practicability of drainage was doubted, and where little or no drainage had been done. A field was secured, half was drained and the other half left undrained. Prior to 1914, eight of these had been started, and the first reports show an average increase of $14.12 per acre in the crop value. In this connection it should be remembered that the season of 1914 was one of the driest on record, showing that drains have a high value even in dry weather. The following table tells the story, the values being computed on the following basis: Oats, 62c per bushel; barley, 63c; wheat, $1.05; straw, $6 per ton:

District.	Kind of Soil.	Crop.	Yield, Bushels.		Gain by Draining.		Value of Increase in Grain and Straw.
			Un-Drained	Drained	Bush. of grain.	Tons of straw.	
							$ cts.
Tara	Clay loam	Fall wheat	11¼	29¾	18½	·785	24 05
Hagersville	Heavy clay	Barley	27½	38	10½	·264	8 19
Napanee	Clay	Oats	12¾	28¾	16	·500	12 92
Peterboro'	Loam	"	31½	67¼	35¾	·750	26 66
Dundalk	"	"	30·6	40·6	10	·333	8 20
Centreville	Muck	"	*	*	28	1·20	24 56
Peterboro'	Heavy clay	Mixed grain	·923 lb.	1433 lb.	510 lb.	·333	8 37
Selkirk		No appreciable difference in crop.					

Average increase due to drainage, all plots..... $14.12

During 1914, nine more of these plots were installed, and further interesting results may be expected next year. Already these demonstrations are having the effect of encouraging draining, and in one neighbourhood alone two carloads of tile were laid in the fall of 1914 by the farmers themselves.

The work of making surveys and holding demonstrations in ditching and tile laying has been carried on with energy. In 1914, 13,386 acres were surveyed, 1,673 miles of drain laid, and 23 demonstrations held. In addition to the work of the college staff proper, a considerable portion of the time of district representatives is taken up in making surveys, and there is no doubt thousands of acres are drained indirectly as well as directly under this influence. With a system by which money may be borrowed from the Government through township councils for drainage, and with experts to make surveys and draw plans free of charge for the farmer upon request, it must be admitted that every possible encouragement is being given by the Government to drainage.

Vegetable growing: A branch devoted to vegetable growing, with a specialist at its head, was organized by the department in April, 1914, and financed with the funds made available by the Act. Mr. S. C. Johnston, B.S.A., is the provincial officer in charge of this work, with headquarters at the department in Toronto.

The market garden industry represents to the province about two million dollars annually, apart from that of growing vegetables for canning purposes. The work carried on included the holding of meetings or short courses, experiments and demonstrations with vegetable diseases and pests, such as celery blight, cabbage-root maggot, onion blight, etc., and the publication of a bulletin on green-house construction and on the vegetable garden.

Demonstrations in Spraying, Pruning and Fruit Packing: During the year 1914, twenty-three demonstration orchards in various parts of the province were conducted by the district representatives of the department, under the supervision of the Fruit Branch. These orchards were thoroughly pruned, sprayed and cultivated. The pruning was in most cases done by men specially sent out by the Fruit Branch. The spraying was left almost entirely in the hands of the representative, and the cultivation was done by the owner of the orchards under the direction of the representative. In addition to the demonstration orchards, many pruning demonstrations were held throughout the fruit districts of the province.

In September 1914, pruning experiments, to be continued indefinitely, were started in a Peel County orchard. This experiment is to determine, if possible, in just what months of the year it is best to have the pruning done, and whether the pruning could safely be done in any month of the year. Four full bearing trees—one Spy, one Greening, one Russett, one Baldwin—are to be pruned each month in the year, so that during the year a total of 48 trees in all will be pruned. This experiment carried on for a sufficient number of years to give accurate results should be of very great value.

During 1914, a new phase of orchard demonstration was undertaken in which three orchards of upwards of four acres each were leased outright for a term of years. In these orchards, demonstrations and experiments in pruning, spraying, cultivation, fertilization, marketing, etc., are to be carried on for a sufficient number of years to insure a fairly accurate result. Various spray materials, clean cultivation with cover crops *vs.* sod-culture, and different fertilizers will be thoroughly tested out on a commercial scale. The harvesting and marketing of the fruit will also be done by the Fruit Branch.

Several fruit-packing schools were held at the Agricultural College during the short course in horticulture. Packing demonstrations and a horticultural information bureau were conducted at several of the leading fall fairs.

Work in Bee-keeping: The department in 1914 spent $9,250 in the interests of bee-keeping, one thousand dollars of which is taken from the Federal grant. This

money was appropriated as follows: For the salary of the Provincial Apiarist and maintenance of the Apicultural Department at the Ontario Agricultural College, $3,550; for general apiculture work in the province including apiary inspection and demonstration, $4,500; to conduct information bureaus on bee-keeping at fall fairs, $500; for the Ontario Bee-keepers' Association, $700.

It is the duty of the Provincial Apiarist to supervise the apiary inspection and demonstration work, to give instruction in bee-keeping at the Ontario Agricultural College, to act as secretary of the Ontario Bee-keepers' Association, and to promote the interests of the bee-keeping industry in every way possible. In 1914, 55 demonstrations were held with an average attendance of 34 at each.

Demonstration Work.

Soil demonstrations: With the assistance afforded by the subsidy, four demonstrators were added to the staff of the chemistry department at the Ontario Agricultural College for soil demonstration work, and two for drainage work. Hitherto the work in connection with soil demonstrations has been largely of a preparatory nature with a view to making soil surveys, and conducting experiments on demonstration plots.

Demonstrations on acid soils, using the fine screenings and dust from rock crushers in place of burned lime, were conducted at a number of points in the province through the district representatives. The interest that these experiments aroused in the subject led to the springing up of at least four plants for the preparation of ground limestone, or carbonate of lime. This is now being offered in sacks for three dollars per ton, f.o.b., at point of shipment, as against the customary price of ten or twelve dollars. Experiments in Europe and in the United States have demonstrated that this form of lime gives better results than the more active freshly burned lime.

Arrangements were made to conduct demonstration plots to determine the production possibilities of sandy soils. One plot of two and a half acres was located at Walsh, in Norfolk County, which is the centre of one of several large areas of sandy soil found in the province. The study and analysis of swamp and sandy soils was continued.

Poultry demonstrations: The assistance given by the grant permitted the appointment of an assistant in poultry husbandry at the college, and aided in financing lectures and demonstrations in poultry-keeping at institutes, poultry gatherings, and at the short courses conducted by district representatives; also in the production of pedigreed male birds for local poultry breeding stations.

Horticultural work: Two assistants, H. S. Fry and G. J. Culham, were appointed in the horticultural department of the college under the Act. The former, besides assisting in lecture work, is engaged in plant breeding experiments. The latter organized eight co-operative experiments in summer pruning and two in top grafting. Winter injury to fruit trees was investigated, as were the conditions and possibilities of fruit growing in the northern districts. Considerable laboratory work was done and assistance given at fruit meetings and institutes.

SESSIONAL PAPER No. 15c

SUMMARY STATEMENT OF EXPENDITURE UNDER THE FEDERAL SUBSIDIES OF 1913-14 AND 1914-15, TO MARCH 31, 1915.

Grant, 1913-14.. .. .. $195,733 32
" 1914-15.. .. .. 230,868 83

Section No.	Classification.	Grants 1913-14 1914-15.	Balance from Agr. Aid Act Nov. 1, 1912.	Total.	Expended to March 31, 1915.	Balance Unexpended March 31, 1915.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1	District Representatives	180,000 00	291 93	180,291 93	179,889 07	402 86
2	O. A. C. Short Courses	3,000 00		3,000 00	2,236 49	763 51
3	Agriculture in Public and High Schools	23,000 00	10,000 00	33,000 00	21,045 33	11,954 67
4	Marketing of Farm Products	6,500 00		6,500 00	5,220 75	1,279 25
5	Buildings at Ontario Agricultural College	128,500 00	38,714 50	167,214 50	146,610 02	20,604 48
6	Stock and Seed Judging Short Courses and Institute Work	15,000 00		15,000 00	11,381 34	3,618 66
7	Women's Institutes	14,000 00	2,872 49	16,872 49	9,065 62	7,806 87
8	Short Courses for Fall Fair and Field Crop Judges	6,640 00		6,640 00	5,930 85	709 15
9	Drainage Work	9,000 00	2,311 05	11,311 05	11,386 98	
10	Demonstrations and instruction in vegetable growing	5,000 00		5,000 00	4,161 72	838 28
11	Demonstration work on soils	7,500 00		7,500 00	5,854 33	1,645 67
12	Demonstration and instruction in live stock and poultry	8,500 00		8,500 00	5,402 20	3,097 80
13	Demonstration work in spraying, pruning and packing of fruits	10,500 00	965 31	11,465 31	8,115 79	3,349 52
14	Work in Bee-keeping	2,360 00		2,360 00	2,051 98	308 02
15	Lectures on Horticulture	1,000 00		1,000 00	566 55	433 45
16	Miscellaneous	6,102 15	1,662 27	7,764 42	2,968 45	4,795 97
	Totals	426,602 15	56,817 55	483,419 70	421,887 47	61,608 16

Section 9:—Over-expended balance, $75.93.

Details of Expenditure of Subsidies of 1913-14 and 1914-15.

No. 1.—District Representatives.

Grant, 1913-14	$ 80,000 00	
" 1914-15	100,000 00	
Balance from Agricultural Aid Act	291 93	
Expended, Nov. 1, 1912 to Mar. 31, 1915	.....	$ 179,889 07
Balance unexpended March 31, 1915	.....	402 86
	$ 180,291 93	$ 180,291 93

Under the Agricultural Aid Act of 1912-13 there was provided the sum of $22,500 for this work. On November 1, 1912, there was an unexpended balance from this grant of $291.93, which was added to the grants under the Agricultural Instruction Act, and which is accounted for herein. The details of the expenditure of the $22,208.07 may be found in the Appendix to the Public Accounts of Ontario, pp. 7-12. These Federal grants were used to supplement the provincial grants for the same purpose. The charges against the Federal grants were kept quite distinct from the provincial expenditures and fully set out in the report published by the Auditor of Ontario.

The following statement covers a period of twenty-nine months, November 1, 1912, to March 31, 1915. As a county represents the field of operations of every officer, the expenditures are given according to counties. In every case the amount includes the following: Salaries of assistant representatives, office help, rent, office supplies, travelling and miscellaneous disbursements necessitated by the work carried on.

Brant	$ 3,885 68	Norfolk	$ 4,403 47
Bruce	4,704 22	Northumberland	5,251 55
Burk's Falls	852 89	Northumberland and Durham	438 62
Carleton	4,325 45	Ontario	4,374 55
Dryden	953 52	Oxford	4,949 85
Dufferin	3,771 68	Peel	5,572 19
Dundas	4,010 88	Peterborough	5,975 62
Durham	5,794 60	Prince Edward	4,637 42
Elgin	4,161 33	Port Arthur	829 84
Essex	4,616 97	Rainy River	4,721 36
Fort William	863 97	Renfrew	4,676 65
Frontenac	4,578 12	Simcoe	4,193 68
Glengarry	6,073 04	Sault Ste. Marie	2,664 09
Gore Bay	4,970 41	Sudbury	1,351 42
Grey	4,142 84	Victoria	4,477 16
Haldimand	4,712 31	Waterloo	4,270 20
Halton	2,259 64	Welland	2,516 65
Hastings	3,361 49	Wentworth	2,064 42
Kent	5,679 15	York	3,998 21
Kenora	1,805 80	Miscellaneous	5,033 63
Lambton	4,315 15		
Lanark	5,919 78	Total	$ 180,439 07
Leeds and Grenville	4,709 75	Refunds	550 00
Lennox and Addington	5,061 39		
Middlesex	5,405 03	Net expenditure	$ 179,889 07
Muskoka	487 72		
New Liskeard	2,615 68		

In the above, Burk's Falls, Dryden, Fort William, Kenora, Muskoka, New Liskeard, Port Arthur, Rainy River, Sault Ste. Marie and Sudbury are the headquarters of the district representatives in the northern district outside of the organized counties. The two entries for Northumberland are explained by the fact that when first organized one office covered the united counties of Northumberland and Durham. Subsequently, however, an office was created for each county.

2.—O. A. C. Short Courses.

Grants: 1913-14 $1,500, 1914-15 $1,500	$ 3,000 00	
Expended to March 31, 1915	.....	$ 2,236 49
Balance unexpended March 31, 1915	.....	763 51
	$ 3,000 00	$ 3,000 00
R. H. Harding, services, $65, expenses, $49.40		$ 114 40
Travelling and living expenses of prize winners		2,090 59
Loan of live-stock		29 00
Incidentals		2 50
		$ 2,236 49

The winners of the acre-profit and live-stock competitions conducted by the district representatives are given a short course at the Ontario Agricultural College. Their travelling and living expenses in connection with the course are charged against this appropriation. These competitions, referred to on page 24, are limited to boys on the farms. All of the above expenditure was incurred subsequent to 31st October, 1913. There were 68 "winners" in the 1913 competitions who were given the short courses at the college in January, 1914, and 47 winners in the 1914 competition who took the course in January, 1915. The above $2,090.59, therefore, covers the expenses of 115 farm boys.

3.—Agriculture in Public and High Schools.

Grants: 1912-13, $10,000; 1913-14, $10,000; 1914-15, $13,000	$ 33,000 00	
Expended to March 31, 1915	.....	$ 21,045 33
Balance unexpended March 31, 1915	.....	11,954 67
Total	$ 33,000 00	$ 33,000 00
R. H. Abraham, Field Agent, services and expenses		$ 1,900 49
W. J. Austin, " " "		755 42
R. A. Finn, " " "		1,443 53
A. M. McDermott, " " "		1,421 43
J. E. McLarty, " " "		1,194 39
E. L. Small, " " "		1,191 64
J. C. Fuller, " " "		636 40
S. E. Percival, " " "		849 44
Mrs. H. B. Miller, assistant to director		917 65
H. Loree, services and expenses		116 86
Travelling expenses, inspectors		840 40
Instructors, services, summer school, 1913		1,044 15
Instructors and students, expenses, summer school, 1913		1,215 56
Instructors, services, summer school, 1914		1,596 50
Teachers' expenses, summer school and teachers' conference, 1914		2,074 28
Services of lecturers, rural teachers' conference		402 27
School grants, bonuses for agricultural teaching		1,791 00
Moving picture machine		174 75
Addressing machine		245 00
Printing, books, advertising, seed, etc		1,260 52
		$ 21,372 68
Less refunds		327 35
		$ 21,045 33

Under the Agricultural Aid Act $10,000 was appropriated for this work. As it had not been used at the close of the Ontario fiscal year, October 31, 1912, it was added to the $10,000 provided in the Agricultural Instruction Act Agreement of 1913-14. To these was added $13,000 in the agreement of 1914-15, thus making $33,000 in all. The above statement covers the expenditure down to March 31, 1915. These Federal grants were used to supplement the provincial funds provided to carry

on the work of teaching agriculture in the public and high schools under Prof. S. B. McCready, Director of Agricultural Education. It will be seen that the Federal grant was used mainly for the following purposes: Services of an assistant, services of field agents, expenses of summer school for teachers, expenses of rural teachers' conference, expenses of Public School Inspectors' Course, special grants to schools for teaching agriculture.

4.—Marketing Farm Products.

Grants: 1913-14, $5,500; 1914-15, $1,000	$ 6,500 00	
Expended to March 31, 1915	.....	$ 5,220 75
Balance unexpended March 31, 1915	.....	1,279 25
Total	$ 6,500 00	$ 6,500 00
F. C. Hart, Director, salary and expenses		$ 3,350 82
T. D. Jarvis, assistant		427 51
Stenographer		557 69
Equipment and furnishings		289 73
Furniture		233 50
Stationery, postage, incidentals		361 50
Total		$ 5,220 75

The Markets Branch of the Provincial Department was created under the Federal grant of 1913-14, when $5,500 was appropriated. Mr. F. C. Hart, B.S.A., who had been for six and one-half years district representative for the county of Waterloo, was appointed director, at a salary of $2,000 a year. All of the cost of this branch is met out of the Federal grant.

5.—Buildings at Agricultural College.

Grant, 1913-14	$ 56,500 00	
" 1914-15	72,000 00	
Balance from Agricultural Aid Act	38,714 50	
Expended to March 31, 1915	.....	$ 146,610 02
Balance unexpended March 31, 1915	.....	20,604 48
Total	$ 167,214 50	$ 167,214 50
Bacteriological Building—		
Supplies, materials, etc	$ 948 86	
Contracts	150 00	
Day labour	317 00	
Furniture	1,084 00	
		$ 2,499 86
Field Husbandry Building—		
Supplies, materials, etc	$ 1,055 87	
Contracts	55,037 96	
Furniture	2,744 84	
Day labour	435 41	
C. A. Zavitz, accountable	300 00	
W. C. Tanner, Clerk of Works	944 50	
		60,518 58
Poultry Building—		
Contracts	$ 29,348 34	
Day labour	233 25	
Furnishings	367 90	
Material and supplies	1,764 18	
Plans, etc	261 66	
W. C. Tanner, Clerk of Works	260 00	
		32,235 33
Dairy Barn—		
Contracts	$ 1,676 10	
Labour	81 25	
Material and supplies	1,242 65	
		3,0 0 00

To Complete Buildings at O. A. C. in Ed.—		
Contracts	$ 14,285 40	
Materials and supplies	20,723 65	
Day labour	10,249 87	
Furniture and furnishings	1,002 30	
S. A. Armstrong, accountable	2,000 00	
Incidentals	95 03	
		$ 48,356 25
Total		$ 146,610 02

6.—Stock and Seed Judging.

Grants: 1913-14, $7,500; and 1914-15, $7,500	$ 15,000 00	
Expended to March 31, 1915	.....	$ 11,381 34
Balance unexpended March 31, 1915	.....	3,618 66
Total	$ 15,000 00	$ 15,000 00

Services and expenses of Instructors as follows—

N. D. McKenzie	$ 692 45	
Dr. H. G. Reed	901 25	
G. Barbour	134 30	
C. E. Bain	46 40	
G. Brethour	216 10	
J. F. Carpenter	32 85	
D. McVannell	12 00	
J. Gardhouse	251 60	
C. Hamilton	79 80	
W. J. Gardhouse	528 70	
J. P. Sackville	12 40	
R. B. Hinman	15 70	
A. C. Hallman	89 65	
F. R. Mallory	72 65	
R. H. Harding	365 55	
M. J. McQueen	40 55	
J. M. McCallum	589 55	
R. L. Moorehouse	344 95	
H. C. Nixon	145 25	
A. Leitch	56 55	
G. S. Peart	75 10	
C. E. Potter	32 15	
H. M. Robinson	67 15	
R. S. Stevenson	125 95	
Dr. J. A. Sinclair	327 70	
C. Schuyler	50 00	
R. B. Smith	265 75	
F. H. Silcox	243 20	
R. S. Stevenson	318 05	
		$ 6,123 30
Advertising and printing		756 98
Live-stock loaned		232 25
Rent of halls, tents, stables and caretaking		482 70
Labour, cartage, board and supplies		656 09
Livery and travelling		1,169 12
Freight and express		205 07
Postage		276 30
Sundry persons, accountable warrants		1,400 00
Lantern and slides		151 88
		$ 11,453 69
Less refunds		72 35
Total		$ 11,381 34

The above expenditure covered the services and expenses of instructors and incidental disbursements at the two-day courses in live-stock and seed judging carried out under the direction of Mr. G. A. Putnam, Superintendent of Farmers' Institutes.

7.—Women's Institutes.

Grant, 1913-14	$ 6,500 00	
" 1914-15	7,500 00	
Balance from Agricultural Aid Act	2,872 49	
Expended to March 31, 1915	.....	$ 9,065 62
Balance unexpended March 31, 1915	.....	7,806 87
Total	$ 16,872 49	$ 16,872 49

Lecturers, Services and Expenses—

Mrs. N. H. Altenburg	$ 1,667 71	
E. M. Collins	359 76	
Miss G. Gray	2,381 94	
Miss I. J. Hobbs	46 40	
Miss Mary E. Mackenzie	667 85	
Miss L. McAllister	40 00	
Miss M. V. Powell	46 65	
Miss E. McKay	707 29	
Miss M. McPayden	273 08	
Miss J. C. Smith	268 05	
Mrs. D. H. Pirie	154 85	
Mrs. M. L. Woelard	21 25	
Mrs. L. R. Stephen	20 80	
Dr. Annie Backus	87 21	
Miss N. Allely	120 24	
Miss D. Hughes	827 19	
Miss A. McDonald	248 08	
Mrs. H. W. Parsons	206 65	
Miss Pauline Shaw	12 00	
A. Chapman	305 20	
		$ 8,462 20
Less refunds 1911-12		110 10
Total		$ 8,352 10
Incidentals		$ 173 52
Printing and binding minute and cash books		440 00
Two hundred copies *Public Health Journal*		100 00
Total		$ 9,065 62

The above persons gave instruction at short courses and rural classes in cooking, sewing and home life.

8.—Short Courses, Fair and Field Crop Judges.

Grant: 1913-14, $5,140; 1914-15, $1,500	$ 6,640 00	
Expended to March 31, 1915	.....	$ 5,930 85
Balance unexpended March 31, 1915	.....	709 15
Total	$ 6,640 00	$ 6,640 00

To this is charged the services and expenses of instructors at the short courses held at the Agricultural College, and at the Central Experimental Farm, Ottawa, for the judges sent out by the department to judge in the standing field crop competitions and at fall fairs. Their expenses attending the courses are met out of this fund.

9. Drainage Work.

Grant, 1913-14	$ 5,000 00	
" 1914-15	4,000 00	
Balance from Agricultural Aid Act	2,311 05	
Expended to March 31, 1915	.....	$ 11,386 98
Balance over-expended March 31, 1915	75 93	
Total	$ 11,386 98	$ 11,386 98

R. H. Clemens, Superintendent, salary and expenses	$ 1,452 90
A. E. McLaurin, Foreman, salary and expenses	1,288 63
C. M. Laidlaw, Soil Analyst, salary and expenses	931 36
M. J. Underhill, Soil Analyst, salary and expenses	294 08
Fieldmen, various persons	481 85
Draftsmen, various persons and expenses	302 33
Machine operators	1,190 45
Stenographers	425 50
Tile layers, sundry persons	912 96
Day labour	80 12
W. H. Day and J. W. Fry, college staff, travelling	266 20
Tile	1,248 90
Express, freight and cartage	777 45
Materials, repairs, supplies and incidentals	1,734 25
Total	$ 11,386 98

The above expenditures cover cost of inspection of fields, preparation of survey plans, and the initial work in the making of ditches and the laying of tile.

10.—Demonstrations in Vegetable Growing.

Grants: 1913-14, $2,500; 1914-15, $2,500	$ 5,000 00	
Expended to March 31, 1915	.....	$ 4,161 72
Balance unexpended March 31, 1915	.....	838 28
Total	$ 5,000 00	$ 5,000 00

C. S. Johnston, Director, salary and expenses	$ 3,268 98
Furnishings and equipment	308 40
Sundry persons, services and expenses	161 80
Supplies and stationery	170 06
Printing and advertising	5 50
Incidentals and livery	246 98
Total	$ 4,161 72

The above covers all the cost of carrying on the work of this branch. Mr. C. S. Johnston, director of the work of instruction, was appointed at a salary of $1,200 a year, with yearly increase of $100.

11.—Demonstration Work on Soils.

Grants: 1913-14, $2,500; 1914-15, $5,000	$ 7,500 00	
Expended to March 31, 1915	.....	$ 5,854 33
Balance unexpended March 31, 1915	.....	1,645 67
Total	$ 7,500 00	$ 7,500 00

W. L. Iveson, services as instructor	$ 1,834 61
R. Bryant, " "	1,160 00
D. McKee, " "	1,197 11
C. W. Stanley, " "	425 00
Sundry persons, travelling	508 85
Supplies	373 90
Equipment and repairs	252 48
Freight	102 38
Total	$ 5,854 33

As referred to on page 28, this covers the cost of demonstrations in drainage in sections of the province where the value of underdrainage has not been recognized. This is a case of taking drainage to the farmer; whereas the expenditures under section 9 cover cost of work done on application of the farmers.

12. Live Stock and Poultry Demonstrations.

Grants: 1913-14, $4,000; 1914-15, $4,500	$ 8,500 00	
Expended to March 31, 1915	.....	$ 5,402 20
Balance unexpended March 31, 1915	.....	3,097 80
Total	$ 8,500 00	$ 8,500 00
F. W. Marcellus, Instructor, salary and expenses		$ 3,346 74
W. H. King, Instructor, salary and expenses		757 00
Lecturers, Services and Expenses—		
A. Leitch	$ 150 00	
J. W. Clark	108 20	
Miss M. Yates	31 75	
H. Barton	75 00	
W. J. Bell	47 00	
P. A. Boving	40 00	
G. E. Day	45 00	
Gunns, Limited	12 85	
L. S. Klinck	40 00	
R. Miller	65 00	
F. H. Scott	120 90	
J. Gardhouse	40 00	
W. F. Stephen	60 00	
J. Murray	20 00	
Sundry persons	90 00	
		945 70
Travelling and incidentals		352 76
Total		$ 5,402 20

The above covers special instruction in "Extension Work" in live-stock and poultry, Mr. W. H. King being instructor in live-stock, and Mr. F. W. Marcellus, instructor in poultry. These two lines were directed by Prof. Geo. E. Day and Prof. W. R. Graham, of the Agricultural College.

13. Spraying Demonstrations.

Grant, 1913-14	$ 3,600 00	
" 1914-15	7,500 00	
Balance from Agricultural Aid Act	965 31	
Expended to March 31, 1915	.....	$ 8,115 79
Balance unexpended, March 31, 1915	.....	3,349 52
Total	$ 11,465 31	$ 11,465 31
G. J. Culham, Instructor, college staff, salary and expenses		$ 1,803 30
H. S. Fry, Instructor, college staff, salary and expenses		1,305 76
Services and Expenses of Assistants—		
J. T. Barnett	$ 88 11	
S. H. Chase	397 85	
F. C. Donald	296 85	
R. Fox	97 75	
E. Hineman	303 80	
W. F. Kydd	910 66	
W. J. Schyler	199 05	
M. T. Smith	316 37	
L. Smith	138 55	
H. N. Webster	243 78	
M. H. Winter	253 90	
R. Graham	77 10	
W. E. Patterson	129 60	
M. Blackburn	87 60	
W. L. Hamilton	83 80	
E. F. Palmer	276 98	
		$ 3,901 75
Labour and horse hire		309 70
Materials and supplies		324 65
Incidentals and livery		470 63
Total		$ 8,115 79

Demonstrations in Bee-keeping.

Grants: 1913-14, $1,360; 1914-15, $1,000	$ 2,360 00	
Expended to March 31, 1915	.....	$ 2,051 98
Balance unexpended March 31, 1915	.....	308 02
Total	$ 2,360 00	$ 2,360 00
Instructors, services		$ 1,366 75
" expenses		631 53
Incidentals		53 70
Total		$ 2,051 98

15. Lectures in Horticulture.

Grants: 1913-14, $500; 1914-15, $500	$ 1,000 00	
Expended to March 31, 1915	.....	$ 566 55
Balance unexpended March 31, 1915	.....	433 45
Total	$ 1,000 00	$ 1,000 00
Instructors, services		$ 244 00
" expenses		322 55
Total		$ 566 55

16. Miscellaneous.

Grants, 1913-14	$ 4,233 32	
" 1914-15	1,868 83	
Balance from Agricultural Aid Act	1,662 27	
Expended to March 31, 1915	.....	$ 2,968 45
Balance unexpended March 31, 1915	.....	4,795 97
Total	$ 7,764 42	$ 7,764 42
Grant to Elgin Corn Growers' Association		$ 200 00
S. C. Johnston, travelling		274 87
Milking machine		393 40
Alfalfa seed		1,012 75
Steer to Brandon, transportation		195 55
Duty and freight		118 71
L. D. Harkinson, services and expenses		51 15
Incidentals		60 30
Moving picture outfit		235 00
Sundry persons, services and expenses		112 47
Dairy appliances		280 55
Live-stock		33 70
Total		$ 2,968 45

The Brandon steer, champion at the International Show, Chicago, was brought to Ontario for demonstration purposes. The alfalfa seed was for experimental and demonstration purposes (see Report of 1913-14, pp. 90-92). The milking machine has been placed at the Agricultural College. The moving picture machine will be used for demonstrations throughout the province.

AGRICULTURAL AID ACT GRANT, 1912.—STATEMENT TO MARCH 31, 1915.

Classification.	Grant.	Expended Oct. 31, 1912.	Unexpended Oct. 31, 1912.	Disposal of Balance.	Expended Mar. 31, 1915.	Balance Unexpended Mar. 31, 1915.
	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.
Field Husbandry Building, O.A.C.	40,000 00	1,285 50	38,714 50	Included with 1913-14 Grant.		
District Representatives	22,500 00	22,208 07	291 93	"		
Poultry Work	10,000 00	625 00	9,375 00	Carried forward	9,995 61	4 39
Milking-Shorthorns	12,500 00	22 79	12,477 21	"	10,643 89	1,856 11
Fruit Work	9,000 00	2,478 18	6,521 82	"	8,034 69*	
Drainage	5,000 00	2,688 95	2,311 05	Included		
Dairy Survey	2,000 00	245 03	1,754 97	Carried forward	1,784 49	215 51
Miscellaneous	2,233 32	571 05	1,662 27	Included		
O.V.C. Additional Land	15,500 00	1,800 00	13,700 00	Carried forward	2,005 07	13,494 93
Agricultural Exhibition Buildings	10,000 00	7,500 00	2,500 00	"	10,000 00	
Shourt Courses	7,000 00	675 00	6,325 00	"	7,000 00	
Live Stock Northern Ontario	5,000 00	1 95	4,998 05	"	5,000 00	
Women's Institutes	3,500 00	627 51	2,872 49	Included		
West Ontario Creamery Work.	1,500 00	303 75	1,196 25	Carried forward	368 10	1,131 90
Soil Survey	500 00	284 83	215 17	"	500 00	
E. Ontario Live Stock Building	12,000 00		12,000 00	"	12,000 00	
Agriculture in Public Schools	10,000 00		10,000 00	Included		
Western Fair London	7,500 00		7,500 00	Carried forward	7,500 00	
Totals	175,733 32	41,317 61	134,415 71		74,831 85	16,702 84

*Expended on Oct. 31, 1914. The balance under this section of $965.31 was included with the 1914-15 Grant.

SESSIONAL PAPER No. 15c

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913 AND 1914, AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912, To Oct. 31.	1913, To Oct. 31.	1914, To Oct. 31.	1915, To Oct. 31 (Estimated).
	$ cts.	$ cts.	$ cts.	$ cts.
Department of Agriculture— Salaries; Contingencies; Incidentals and Miscellaneous	100,718 25	98,306 79	109,973 95	119,875 00
County Representatives	35,578 78	40,596 68	39,668 93	40,600 00
Live Stock Interests— Grants and Winter Fairs; Grants to Poultry Association and Horse Shows; Stallion Registration; Sheep Experiments, etc.; Spring Shows	32,887 64	38,793 66	38,563 78	46,400 00
Dairy Interests— Grants; Instruction and Inspection; Dairy School; Miscellaneous	60,784 32	58,574 35	58,701 09	62,000 00
Agricultural and Horticultural Societies— Insurance; Field Crop Competitions and Judges; Expert Judges; Exhibitions; Special Grants	137,732 59	129,473 98	125,548 19	154,500 00
Institutes—Farmers' and Women's	31,068 70	32,932 25	27,323 52	30,800 00
Fruit Interests— Grants; Spraying Assistance; Special Crop Experiments; Cold Storage Experiments and Exhibits; San Jose Scale; Horticultural Experiment Stations; Apiary Inspection; Demonstration Work	47,296 79	45,454 87	54,934 72	53,900 00
Ontario Veterinary College— Salaries and Expenses	32,396 25	32,929 74	33,589 22	37,400 00
Ontario Agricultural College, Macdonald Institute, and Ontario Experimental Farm: Salaries and Expenses	256,742 95	264,458 55	284,507 65	301,558 42
Totals	735,206 27	741,520 87	771,811 05	847,033 42
Revenue	167,224 91	177,131 50	157,141 80	125,000 00
Net total	$567,981 36	$564,389 37	$614,669 25	$722,033 42

BY THE DEPARTMENT OF EDUCATION.

Service.	1913, to Oct. 31,	1914, to Oct. 31.	1915, to Oct. 31, (estimated).
	$ cts.	$ cts.	$ cts.
Director Elementary Agricultural Education	2,600 00	2,600 00	2,600 00
Instruction in Agriculture and Horticulture, and Grants to School Gardens	4,477 79	4,482 66	4,500 00
Instruction in Industrial Arts and Household Science	110 00	30 00	2,000 00
Travelling expenses, Normal School students, and Nature Study	1,016 60	1,155 34	1,200 00
School Gardens for Normal Schools	45 25	130 70	1,000 00
Agricultural training in High Schools by District Representatives	36,350 00	37,120 33	43,200 00
Special Industrial and Agricultural Education	3,646 17	2,206 16	5,000 00
	$48,245 81	$47,725 19	$59,500 00

QUEBEC.

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

Poultry raising	$ 16,000 00
Fruit culture	20,000 00
Bacon industry	9,000 00
Schools of Agriculture	60,000 00
Agricultural instruction in Academies, Rural and Normal schools	7,000 00
District representatives	12,000 00
Experimental Union	2,000 00
Alfalfa and clover	2,000 00
Seed selection	4,000 00
Bee-keeping	8,000 00
Tobacco industry	3,000 00
Dairy industry	17,000 00
Drainage	8,000 00
Domestic science	10,000 00
Maple sugar	3,000 00
Lectures	6,409 16
Total	$ 187,409 16

OUTLINE OF WORK PERFORMED.

The following statement of the work carried on in the province of Quebec is based mainly on the report of Mr. J. C. Chapais, of St. Denis en bas (Kamouraska County), who is Assistant Commissioner of Agricultural Instruction for the province of Quebec. Mr. Chapais visited the schools of agriculture, inspected the demonstration work, assisted at agricultural conferences, and verified the expenditures.

Nearly one-third of the Federal Subsidy for 1914-15 was allotted to the Schools of Agriculture. The remainder aided the Department of Agriculture (1) to carry on instruction in scientific methods of agriculture, and (2), to promote agricultural teaching and instruction in domestic economy in the schools.

Of the institutions devoting themselves entirely to the teaching of agriculture there are four in the province, the Macdonald College, the Agricultural Institute at Oka, the Agricultural School at Ste. Anne de la Pocatière, and the Dairy School at St. Hyacinthe.

THE MACDONALD COLLEGE.

This institution is organized into three departments: (1) The School of Agriculture, (2) The School for Teachers, and (3) The School of Household Science.

The School of Agriculture provides theoretical and practical instruction in agriculture, and carries on investigation and research work. The two-year course qualifies for a diploma, and the four-year course for the degree of Bachelor of Science in Agriculture.

School for Teachers: This institution is intended to give a thorough training to Protestant teachers. The course includes nature-study, household science and manual training. Teachers give a guarantee to teach for at least three years in the province of Quebec after graduating. In addition to Elementary, Kindergarten and Model School diplomas, a model diploma is granted to agricultural students. The latter course combines the work of the School for Teachers with that of the first two years in the regular course in Agriculture.

School for Household Science: The courses offered are as follows:

(a) Homemaker Course—One year;

(b) Institutional Administration Course—two years;

(c) Short Course—(3 months). Three courses in all branches of household science; one in dressmaking, and certain special short courses.

Federal Aid: The aid given to the work of the Macdonald College, under the Agricultural Instruction Act, amounted to $20,000 for the year 1914-15. From this sum are provided the salaries of additional members of the staff, the salaries (summer only) of District Demonstrators and their assistants, and of the Homemaker Club Demonstrator, amounting in all to $12,505, the balance going to meet the expense (wholly or partly) of the work carried on by these officers, which was as follows:—

(*a*) Animal Husbandry: This department is concentrating its attention on increasing the number of pure-bred sheep in the province and in forming wool associations. A number of these have been organized. During the year, 10,000 pounds of wool produced by members was graded and marketed at an average price of 30 cents per pound, some 7 to 10 cents more than was received for wool sold individually. A grader from the Massachusetts Institute of Technology was employed. An experiment in feeding grain screenings to sheep and lambs was conducted, and shearing demonstrations held.

(*b*) Bacteriology: Conclusion of investigations into the milk supply of Montreal.

(*c*) Biology: Investigation work in connection with weeds and insects.

(*d*) Cereal Husbandry: Owing to the probable scarcity of European seed in 1916, this branch is seeking to promote the growing of root seed by the farmers. Demonstration meetings have been held and experiments conducted at eight centres. Better results have been secured from Canadian-grown than imported seed. Improved seed is being raised and distributed with a view to inducing root-seed production. Cultural experiments have also been conducted. The work is financed entirely by the grant.

(*e*) Chemistry: The services of Mr. Van Zoeren, Chief Chemist of the St. Louis Sugar Refinery, have been secured, and work has begun on methods of detecting adulteration in maple sugar.

(*f*) Horticulture: Twenty orchard demonstrations were held in the spring of 1915, a vegetable-garden bulletin was prepared and issued; an experimental irrigation system for vegetables and small fruits was installed, and seed distributed to school children.

(*g*) Household Science: Under the direction of the School of Household Science, 21 Homemakers' Clubs were organized during the year, the total number established being 33. Four travelling libraries were sent out, besides bulletins, pamphlets and other literature. The second annual Convention of these clubs was held at the College in June, 1915, and 40 delegates attended. A demonstrator assists the women of rural communities in organizing clubs, and gives lectures and demonstrations.

(*h*) Physics: Continuation of investigation work in connection with soil moisture.

(*i*) Poultry: Demonstration horses have been established at six points, where breeding flocks will be maintained and the eggs distributed. In connection with school fair work, 610 settings of eggs were distributed.

(*j*) Veterinary Work: In addition to the classes at the College, demonstrations and lectures have been given at points throughout the province.

(*k*) District Demonstrators: Eight graduates of the College have been appointed resident demonstrators in certain farming centres. They have also been given assistants. The work carried on is similar to that performed by the District Representatives of the Province of Ontario. They are also teaching agriculture in 23 academies and schools. Through their efforts, children's potato, corn, and other clubs have been organized.

The materials supplied and distributed to these clubs consisted of settings of eggs, seed potatoes, improved seed wheat, oats, barley and corn, and flower and vegetable seeds. In 1914, seven school fairs were held in five centres, embracing over sixty schools. In some cases the attendance exceeded that of the county fair.

Short Courses: During the year six short courses were held at the College and twenty-three at outside points. The College courses included: (*a*) Special course of one month in Agricultural Drainage for students of the various agricultural colleges in the province, with the object of training them for drainage survey work to be carried on by the Provincial Department of Agriculture. Five students from each of these colleges attended. (*b*) Three courses in Household Science, each of about eleven weeks duration; attendance 60; (*c*) A four-day course in Horticulture; attendance, 28 men, 12 women; (*d*) a three-weeks' course in Poultry; attendance, 13 men and 9 women. Total attendance at all College Short Courses, 137.

The nature of the outside courses varied according to the departments offering them. The members of the staff are impressed with the value of those courses, not only to the farmers, but to themselves, bringing them into touch with the needs of the farming community, and giving the people a better understanding of the work that the College seeks to accomplish. The total attendance at the men's courses was 2,539, and at the Household Science Courses held at nine places, the attendance was 675. Ninety addresses were given by seventeen members of the staff.

THE OKA AGRICULTURAL INSTITUTE.

The Agricultural Institute at Oka, (recently affiliated with Laval University) serves the western part of the province and is carried on by the Trappist Fathers.

The full four year course leads to a degree and includes practical and theoretical work in the following: Butter and cheese-making (including Cheddar and soft cheese), field culture, study of soils, fruit and tree culture, kitchen gardening, breeding and raising of live stock, bee-keeping, dairying, wine, cider and maple-sugar making, and the canning of fruits and vegetables.

Federal Aid: The grant to this institution was $20,910. Of this amount $10,044.96 went to provide salaries for members of the staff added through the Act. An annual allowance of $5,000 is made to meet the cost of extending the College building.

Short Courses.—Short courses for farmers were held from January 11 to 23. The attendance was 127 students, who were boarded and lodged at the institute. About 30 persons not entered as regular students boarded outside, and attended the lectures. Eighty students were refused on account of lack of accommodation, but with the completion of the building extension, this will be avoided. No lectures are given outside the institute by members of the staff. The subjects taught were as follows: First week: General farming, gardening and canning of fruits and vegetables, fruit culture, cider and vinegar making, good roads; horse-breeding. Second week: Cattle-breeding and dairying; poultry, beekeeping; swine breeding and the preparation of cured meats; maple products; agricultural teaching in rural schools; co-operation.

The practical work performed in the laboratory and various departments of the farm, included grafting, making and sowing of hot-beds, etc., killing and plucking fowl, egg-testing, incubator operations. During the evenings, lantern-slide lectures were given. During the short courses, the annual meetings of the Quebec Experimental Union and Young Farmers' Association were held at the institute.

THE STE. ANNE DE LA POCATIÈRE SCHOOL.

The Agricultural School at Ste. Anne de la Pocatière serves the French population in the eastern part of the province. The school is under clerical control, and the course of study is similar to that of Oka. Arrangements are being made for its affiliation with Laval University. Under the Instruction Act, the school received a grant of $18,090 for the year 1914-15, including board allowance for students.

Short Courses.—Over two hundred persons attended the Short Course lectures in the early part of 1915, held at this school. The attendance is increasing each year, indicating that the method of teaching is appreciated. The following subjects were dealt with, viz.: Selection and feeding of stock, dairying, including cow-testing, manures, and fertilizers, rotation of crops and pasture, book-keeping, forestry, fruit-culture and bee-keeping.

Mr. J. C. Chapais, Assistant Commissioner for Quebec, reports as follows:—

"I have visited three times this year both the Oka Agricultural Institute and the Ste. Anne de la Pocatière Agricultural Schools. These two institutions have had, until now, to refuse the admission of many students for lack of accommodation. A fine, compact and capacious building has been erected at the Oka Institute, which is now ready for occupation, and two spacious wings are being added to the Ste. Anne de la Pocatière school, which will be ready for occupation in the course of the present year. With these new buildings, which the grant of the federal subsidy has enabled them to erect, the schools will have ample room for their laboratories, museums, libraries, classes, as well as all the space needed to double the number of students.

"These two establishments have had to bear the absence of some of their professors from France and Belgium, who were called to the front. One of them, Mr. Nagant, of Oka, has even been a prisoner of the Germans for six months, but has now returned to the institute.

"A new bulletin on vegetable gardening has been written by the Horticulturist of the Oka Institute, and printed and distributed by the Quebec Department of Agriculture."

AGRICULTURE AND HOUSEHOLD SCIENCE IN SCHOOLS.

This department of work comes under the control of the Department of Public Instruction. In 1899 the legislature enacted that agriculture should be taught in all rural schools. Hitherto the results have been unsatisfactory, so far as the elementary schools are concerned; the principal reason being that the teachers, almost entirely women, had not received the necessary training and were not competent to deal with the subject, and made little impression on public opinion.

In the opinion of the Superintendent of Public Instruction, Quebec, in common with the other provinces, is beginning to recognize the meaning and value of the work and a real demand is beginning to be felt for agricultural teaching in rural schools. To meet this demand the Roman Catholic Normal Schools are giving a complete course in agriculture for rural teachers. These teachers-in-training receive lectures by specialists, and are required to qualify in the subject before receiving their diploma. Those who have qualified recently may be regarded as competent instructors. Protestant teachers receive instruction at the Macdonald College.

The Oka Institute provides special agricultural courses for Roman Catholic school inspectors and a number have already qualified to supervise the work. Macdonald College is arranging for a similar course for Protestant inspectors.

The Protestant Committee of the Council of Public Instruction is now taking steps towards the carrying on of a summer school for teachers who have not attended Macdonald College. With a view to preparing teachers in model schools and rural concentration schools in the province to teach agriculture, an arrangement has been entered into between Macdonald College and the Protestant committee whereby each student of the first year in agriculture who has passed the school leaving examination has the privilege to study for the model diploma during his course in agriculture. This diploma is granted on completion of two years' training.

The Macdonald district demonstrators give lectures in some of the model schools and academies, and arrrangements are being made to extend and systematize the work.

School Gardens: School gardens are not required by regulation but the movement has made a natural growth through private initiative and enthusiasm. At the Macdonald Training School for Teachers each teacher is required to cultivate a garden plot and all work in the "Nature Study" department, such as the relation of air, soil and water to plant and to human life, is based on observation and experiment made by the student in garden, field or laboratory. This year the children in 234 schools took up the work of school gardens, an increase of 50 schools over 1914.

The district representatives contribute to the success of the school gardening movement, besides being active in organizing children's clubs. Several school fairs were held, and a further development is looked for in this direction. The department furnished seeds, eggs, fertilizer and garden tools.

Domestic Science: This subject is obligatory in the girls' department of the Roman Catholic Normal schools. At Macdonald College it forms a separate branch of instruction, being so extended that pupils may fit themselves to act as teachers.

Domestic science subjects do not form a part of the compulsory course of instruction in the public elementary schools, but in many of the convent schools these subjects are taught to the pupils in residence and sometimes also to day pupils. In some of the Protestant schools of Montreal, and one in Quebec city, domestic science courses are provided, but attendance is optional.

Mr. Chapais reports that there are forty-five schools of domestic science in the province, all except two (Macdonald College and one in Montreal) being convent schools. The total number of pupils in attendance at all schools is 4,322. Those now engaged in teaching in convent schools are offered a special short course at the Normal schools at Roberval and St. Paschal. Teachers from all quarters have responded. To assist in the carrying on of this work a grant of $300 is made to each school from the federal subsidy.

The convent schools afford the household science pupils a certain amount of outside instructions, including garden, poultry, apiary, orchard and dairy work. Rev. O. E. Martin writes:—

> "Each school also has a modern poultry house, and some have splendid flocks of fowls. The preparation of grain and mashes, the cleaning of nests and roosts, the ventilation, etc., are all part of the daily programme. With the poultry house there are also the incubator, the brooder and the care of eggs and chicks. The pupils, at least the most advanced, know all about these things. But they are quite as much interested in gardening work as in poultry work. Most of them take a real delight in conducting a hot-bed, examining the seeds, seeding, preparing the soil, transplanting, weeding, etc. The apiary, the small orchard and the growing of flowers are also the object of the attentive care of the pupils. Great stress is laid on the importance of cleanliness in the production and conservation of milk."

This year twenty-eight domestic science schools made a display of pupils' work at the Quebec Exhibition. A gold, a silver and a bronze medal, and three diplomas were awarded. The exhibits were considered one of the most attractive features of the exhibition.

Outside Short Courses: During the early months of 1915 short courses of one week's duration were held in fifteen counties. These courses were for the benefit of the French-speaking communities and were distinct from those held under Macdonald College auspices.

Young Farm Women's Clubs: The short courses led to the organization in several localities of "Cercles des Jeunes Fermieres," or Young Farm Women's Clubs. These have been established at Roberval, Lake St. John County, at Chicoutimi,

Chicoutimi County, and at Champlain, Champlain County, and average fifty members. These differ to a certain extent from the women's institutes. The chief object of the institutes is to teach domestic science, while the clubs deal mainly with agricultural matters, their objects being:—

1. To teach women a knowledge of rural matters and make them interested in such matters—

(*a*) By the establishment of a co-operative library.

(*b*) By the study of various questions of domestic economy, agricultural book-keeping, hygiene, flower-growing, ornamental shrubs and similar matters.

2. To encourage the development of small agricultural industries of particular interest to women, viz: Dairying, bee-keeping, poultry-keeping, horticulture, arboriculture, etc.

Each has been supplied with the equipment necessary for handling bees, poultry, garden and orchards, including 50 dozen eggs for hatching. Experts and lecturers from the Department give instruction. In the spring of 1915, instructors from the fruit division visited each club and planted 600 apple trees, 400 plum trees, 800 strawberry, raspberry, gooseberry and currant plants. The results of the movement are considered to be very satisfactory and a large development is looked for.

Mr. Chapais states that after lecturing at the club at Roberval on agricultural domestic science he visited the garden of the club, "which is established in the centre of the town, and is one of the best vegetable and flower gardens I have had the privilege of seeing. The fact of its establishment at Roberval has given such an impetus to home-garden development that fifty-two new private gardens are under cultivation. At Chicoutimi I also inspected the club's garden, poultry house and apiary started in the spring, and found them well on the way of sound progress."

FRUIT CULTURE.

The work on the fruit branch of the department is performed through the following channels, viz: Fruit stations, experimental fields, demonstration orchards and horticultural societies. About two-thirds of the cost of the work is financed by the Federal grant.

The following have been established:—

(1) *Experimental Fields.*—Sixteen of these are established, some in districts where the climate is severe, with the object of testing out the hardiest varieties.

(2) *Fruit Stations.*—Thirty-six stations have been established to demonstrate practical orcharding. These orchards are in charge of the owners of the land who receive an annual rental of $25 from the department. They are equipped with pruning and spraying appliances and supplied with spraying materials. These are being superseded to some extent by the experimental fields.

(3) *Demonstration Orchards.*—These are intended to serve as models. They are seven in number and are leased by the department at $25 per acre, and furnished with the necessary equipment. Two orchards have grading machines in use, one has a cold storage warehouse and all are equipped with automatic pumps. The total expenditure is limited to $500 per annum for each orchard.

The work performed by the Macdonald College in connection with fruit-culture consists of orchard demonstrations in pruning, spraying, grafting and orchard management, and the distribution of printed matter. In addition it has been deemed wise to establish a number of illustration orchards at central points in sections outside of the better known apple districts. At Lennoxville and at Shawville small orchards of 50 trees of McIntosh Red and Fameuse have been planted, and it is the intention to add more varieties to these in the near future and also to establish other plantings of a

similar nature elsewhere. Only those varieties that are perfectly hardy and most likely to be satisfactory are being planted. The orchards are intended to be a gathering place for meetings in the future as well as a demonstration of just what may be accomplished in apple growing in these sections. The two orchards already planted are under the Macdonald College demonstrators located at Shawville and Lennoxville, and both of these orchards have done exceptionally well during the past year. Plans are now being made for the planting of several more orchards.

The results so far obtained in these various establishments have been so satisfactory that fruit growing has made progress in the whole province. Not only are the farmers now establishing orchards or renovating those that they have already, but everywhere they are organizing new horticultural societies or co-operative associations in order to improve, increase and market the produce. In all the horticultural exhibitions held this year a marked improvement could be noticed by comparison with the previous years in the appearance, the grading and the packing of the fruit.

POULTRY.

Twenty-nine poultry stations at various points in the province are operated under the general supervision of Bro. Ligouri of the Oka Trappist Fathers. Six other demonstration plants are under the direction of the lecturer on poultry at the Macdonald College. In the case of the department plants, the grounds, buildings and equipment are leased to the managers, who supply the birds, which must be pure bred. The superintendent and his assistants give lectures and practical demonstrations in poultry keeping at the domestic science schools, normal schools, poultry stations, and at the six poultry exhibitions held in the province. At the latter, demonstration plants were installed. A two-weeks' course in poultry is offered at Oka to school inspectors. A Bulletin on Poultry was issued and distributed together with a large number of leaflets dealing with poultry topics. Two-thirds of the cost of the department's work in this connection is financed under the federal grant.

The Macdonald College conducted educational exhibits at the larger poultry and agricultural shows in the English-speaking sections and issued a bulletin for distribution.

The following appeared in the Canadian Poultry Review of December, 1915:

"One of the handsomest Bulletins that we have ever seen is that entitled "Farm Poultry," just issued by Prof. M. A. Jull, Macdonald College, P.Q. Not alone is it unique in the quality of its printing, but it contains a mass of quite original matter and a number of engravings that are new to us and to others. It is really a library book and we value it highly, so much so indeed that we hope from time to time to give copious illustrated extracts from the bulletin. Mr. Jull is to be congratulated on his work in issuing such a handsome book, the result of a very considerable amount of care, attention and detail."

DISTRICT REPRESENTATIVES.

Six district agronomists or representatives are operating in the province in addition to the Macdonald College demonstrators who serve the English-speaking communities. Of the six, five are graduates of Oka and one of Macdonald. Assistants have been appointed in several instances. The scope of their work includes the supervision of agricultural societies, farmers' clubs and co-operative associations, lectures, visits to farmers and the promotion of the various phases of agriculture in their respective districts, besides promoting school gardens, school fairs and children's clubs. It is reported that the work of the representatives is beginning to make itself felt in a progressive movement among the agricultural communities of the province. The cost of the work is defrayed by the federal subsidy.

BACON.

To meet the need for men capable of managing plants for bacon-curing, being undertaken by co-operative associations already formed or in process of forma-

tion, a school of instruction was opened in the summer of 1915 at St. Valier, Bellechasse county. The building is 32 x 90 feet with a capacity of 75 pigs per week, and is provided with a first-class refrigeration plant.

The Oka Institute and the school at Ste. Anne de la Pocatière also give instruction in bacon-curing. Work in connection with this industry is under the supervision of Mr. A. Hansen, bacon expert of the Provincial Department of Agriculture, and superintendent O. Garneau. A bulletin on the industry, prepared by Mr. Hansen, has been issued. The expenses of this branch of work are met by the federal subsidy.

Experimental Union.—The Quebec Experimental Union, to which a grant of $500 is made from the subsidy, has its headquarters at the Oka Institute. Assistance is given in the formation of co-operative societies, poultry associations, etc., and seeds and plants are distributed for experiment. The society also conducts a small experimental farm in connection with the Quebec Boys' Normal School. The poultryman, bee-keeper and gardener assist in the work of instruction. A sub-office of the Union has been opened at the farm. Alfalfa seed has been distributed in many districts for experiment. In 1914, demonstrations in regard to cold hen-houses were given in Dorchester county, which resulted in thirty being built.

Alfalfa, Clover and Pure Seed Production: Experiments in alfalfa are conducted through the Experimental Union, and during the last few years tests have been made in all sections of the province by means of small experimental plots.

A number of fields to demonstrate the growing of clover for seed have been conducted from year to year. A clover-hulling machine has been demonstrated by the department in various sections of the province to promote clover seed production. It is anticipated that as a result the province will soon produce enough clover seed to meet requirements.

A commercial organization, known as the Quebec Seed Growers' Co-operative Agricultural Association, with headquarters at Ste. Rosalie, Bagot County, purchases registered seed and distributes the same to its membership. Modern machinery for the cleaning and selection of seed has been installed and two clover hullers are operated for demonstration purposes. Many small co-operative societies also have cleaners and hullers. The provincial association offers special prizes to its members for seed production.

In 1914, sixty-four societies each received a grant of $75 from the department, which distributed $4,892 in prizes to seed growers, two-thirds of the amount being provided by the Federal grant. A provincial seed exhibition is held annually in addition to local exhibitions by agricultural societies.

Underdrainage: The two ditching machines purchased in 1912 excavated 55,885 feet of drain during the year. Nine young men who took the special drainage course at the Macdonald College were employed to supply drainage plans to farmers. Ninety-eight plans were furnished.

Tobacco: A plot to demonstrate tobacco culture is conducted at St. Cesaire, Rouville County, where a building for curing has been provided.

Dairying: The province is divided into fifty districts for inspection and instruction purposes, and an inspector has been provided for each. Salaries and expenses are wholly met by the department. Of the cost of the work, $12,458.71 was provided by the Subsidy.

Bee-keeping.—From the Federal subsidy the sum of $8,000 was expended in connection with apiary inspection and demonstration, particularly as regards the treatment of foul-brood.

Maple Products.—The province makes a specialty of this industry. A circular issued by the department states that the yield of the sugar bushes is greater in value to the province than the yield of its orchards. According to the census figures, in 1910 the value of the yield of sugar and syrup was $1,680,393, while the value of the fruit crop was $1,469,537.

Three sugar-making schools are operated by the provincial department, at Beauceville, Ste. Louise and La Minerve respectively. A number of improvements were made in the school buildings in the summer of 1914 with a view to increasing their efficiency. A course is given at each school, and following is a statement of attendance and operation during the spring season of 1915:—

	Beauceville, Beauce.	Ste. Louise, L'Islet.	La Minerve, Labelle.
Number of trees	3,000	4,000	3,000
Regular students	3	12	4
Visitors	247	605	35
Products—			
Syrup, gallons	330	407	280
Sugar, pounds	216	400	65
Sugar wax, pounds	119	400	10

The department issued a circular during the year on "The Maple Sugar and Syrup Industry." Demonstrations were given at six factories in Portneuf County, which is remote from the schools, the total attendance being 450. One of the short course lecturers visits sugar houses as opportunity offers and gives information on improved methods and products. Lectures were also given at the convention of the Pure Maple Sugar and Syrup Co-operative Association, held in Beauce County in the summer of 1914. This association has made arrangements with the Quebec Cheesemakers' Co-operative Association to handle its products through their Montreal warehouse. Other co-operative associations have been invited to contribute their products. These will be graded by an officer of the department and sold according to quality, and not at an arbitrary trade price, as is already done in the case of dairy products, poultry and cured meats. A law to protect producer and consumer against adulteration has been placed on the statute book. By these means it is hoped that the productiveness of the industry will be greatly increased. The expense of maintaining and conducting the schools is met by the grant.

The Maple Sugar and Syrup Co-operative Agricultural Association was organized at Waterloo, Que., on January 9, 1913. Mr. Jos. H. Lefebvre, of Waterloo, Que., is the secretary. In 1914-15 the association received a grant of $400 from the province of Quebec. In 1910, according to the census, the provincial output was 9,427,694 pounds of sugar and 984,282 gallons of syrup. Beauce, Shefford and Browne were the largest producers, having a total of 4,740,114 pounds of sugar and syrup to their credit, this being 26 per cent of the entire provincial output. The three counties in which the schools are located produced as follows in 1910:—

	Sugar and Syrup.
Beauceville, Beauce Co.	Lb. 2,109,978
Ste. Louise, L'Islet Co.	" 531,093
La Minerve, Labelle Co.	" 288,089

SESSIONAL PAPER No. 15c

FEDERAL SUBSIDY OF 1914-15.

SUMMARY FINANCIAL STATEMENT FROM APRIL 1, 1914, TO MARCH 31, 1915.

Section No.	Classification.	Grant, 1914-1915.	Expended to Mar. 31, 1915.	Balance Unexpended, Mar. 31, 1915
		$ cts.	$ cts.	$ cts.
1	Poultry	16,000 00	6,118 66	9,881 34
2	Arboriculture—Fruit growing	20,000 00	19,000 00	1,000 00
3	Bacon Industry	9,000 00	5,883 46	3,116 54
4	Schools of Agriculture	60,000 00	41,309 53	18,690 47
5	Agricultural teaching in Academies, Rural Schools and Normal Schools	7,000 00	3,792 71	3,207 29
6	District Representatives	12,000 00	3,406 89	8,593 11
7	Experimental Union	2,000 00	500 00	1,500 00
8	Alfalfa and Clover	2,000 00	1,999 97	0 03
9	Seed Selection	4,000 00	2,001 01	1,998 99
10	Bee-keeping	8,000 00	8,000 00	
11	Tobacco	3,000 00	2,433 22	566 78
12	Dairying	17,000 00	12,458 71	4,541 29
13	Drainage	8,000 00	1,043 62	6,956 38
14	Domestic Science	10,000 00	6,050 33	3,949 67
15	Maple Sugar	3,000 00	2,336 44	663 56
16	Conferences, Publications, etc	6,409 16	5,485 50	923 66
	Totals	187,409 16	121,820 05	65,589 11

DETAILS OF EXPENDITURE—APRIL 1, 1914, TO MARCH 31, 1915.

1.—Poultry.

Grant	$ 16,000 00	
Expended to March 31, 1915		$ 6,118 66
Balance unexpended March 31, 1915		9,881 34
Total	$ 16,000 00	$ 16,000 00
Rev. Bro. Liguori, Provincial Superintendent of Poultry, salary and expenses		$ 784 32
Leon Picard, Assistant Provincial Superintendent of Poultry, salary and expenses		725 00
J. D. Barbeau, Assistant Provincial Superintendent of Poultry, salary and expenses		226 50
Tel. Roy, Instructor, salary and expenses		179 10
J. G. Morgan, " " "		641 00
Raoul Dumaine, " " "		552 15
Jean Charbonneau, " " "		187 36
Jean Petraz, " " "		263 82
L. Arscott, " " "		86 85
Arh. Chabot, expenses		20 45
Rev. J. B. A. Allaire, Speaker at Conferences, expenses		221 35
Rev. Fr. Liguori, expenses *re* exhibitions		250 52
Oka Institute, *re* School Inspectors' short courses		120 00
Publications, etc		165 73
Poultry station plants, salary and disbursements of Superintendents		1,207 31
Poultry station plants for equipment		329 73
Model poultry plant, Normal School, Montreal		97 62
Miscellaneous		59 85
Total		$ 6,118 66

2.—Fruit.

Grant	$ 20,000 00	
Expended to March 31, 1915		$ 19,000 00
Balance unexpended March 31, 1915		1,000 00
Total	$ 20,000 00	$ 20,000 00

2.—Fruit—Continued.

Fruits Division—		
Solyme Roy, Chief Arboriculturist, expenses		$ 527 97
J. H. Lavoie, Assistant " "		883 43
Peter Reid, Superintendent of Demonstration Orchards, salary and expenses		651 40
L'Abbe V. A. Huard, Provincial Entomologist, salary and expenses		589 20
D. J. Wood, Expert in Mfg. of Conserves, etc., salary and expenses		1,604 35
Instructors and Lecturers—		
A. LaBel, Arboriculture, salary and expenses		869 03
Phil. Roy, " " "		294 42
L. J. A. Dupuis, " " "		45 25
Phil. Hamel, salary and expenses		615 55
Tel. Roy, " "		24 10
Rev. Pere Leopold, " "		51 58
Adalbert Francoeur, " "		12 75
Alex. Piette, " "		96 15
F. X. Josselin, salary and expenses, and fruit trees for stations		260 64
Art. Fortin, salary and expenses	$32 00	
E. Gagnon, "	22 35	
Emile Roy, "	46 84	
G. Reynaud, "	11 20	
Jos. Lagace, "	35 75	
J. M. Talbot, "	77 67	
F. Letourneau, "	33 00	
M. A. P. Hamel, "	25 30	
		284 11
Assistant Instructors, various small sums for salary and expenses		278 48
Fruit Stations—		
Various small grants and contributions for drainage, trees, etc.		1,713 05
Fruit Experiment Stations—		
Fruit trees, spraying outfits and materials, implements, drainage work, library books, etc.		2,907 18
School of Agriculture—		
Ste. Anne de la Pocatière, buildings		526 17
Oka Institute, grant		195 00
" " towards machine for shelling green peas		135 00
Periodicals and subscriptions		1,548 14
5,000 Fruit Culture	$ 1,250 00	
Various items	298 14	
Exhibitions at Quebec and Sherbrooke		439 40
Demonstrations and lectures in handling fruit, etc., including purchase of two sorting machines and one capping machine, machines for manufacture of conserves		3,917 10
Fruits Branch—		
Furniture and miscellaneous		282 15
Miscellaneous		347 39
Total		$ 19,000 00

3.—Bacon Industry.

Grant	$ 9,000 00		
Expended to March 31, 1915		$	5,883 46
Balance unexpended March 31, 1915			3,116 54
Total	$ 9,000 00	$	9,000 00
A. Hansen, Provincial Bacon Expert, salary and expenses, November to March		$	1,477 25
O. Garneau, Superintendent Abattoir and Bacon industry at Agricultural Schools, salary and disbursements			2,343 51
St. Valier Abattoir, various			43 97
A. C. St. Pierre, Quebec, Manager at St. Valier, salary and expenses			328 45
J. H. Charles, hon. and expenses *re* organization co-operative abattoir			158 80
Art. Perrault, hon., and expenses *re* organization co-operative abattoir			91 00
Employers Liability Insurance			139 60
Publications "Porc à Bacon"			1,220 32
Incidentals			89 56
Total		$	5,883 46

4.—Schools of Agriculture.

Grant	$ 60,000 00	
Expended to March 31, 1915		$ 41,309 53
Balance unexpended March 31, 1915		18,690 47
Total	$ 60,000 00	$ 60,000 00
Oka Institute, grant		$ 18,000 00
Macdonald College, grant		10,000 00
Ste. Anne de la Pocatière, grant		12,000 00
" " board allowance		709 53
Orphelinat Agricole de Vauvert, grant		600 00
Total		$ 41,309 53

Subsequent to March 31, 1915, and in accordance with record of September 10, 1915, the balance of $18,690.47 had been paid over as follows:—

Oka Institute	$ 2,910 00
Macdonald College	10,000 00
Ste. Anne de la Pocatière, grant	4,000 00
" " students' board allowance	1,380 47
Orphelinat Agricole de Vauvert	500 00
Total	$ 18,690 47

For details of expenditure, see page 51.

5.—Agricultural Teaching in Academies—Rural and Normal Schools.

Grant	$ 7,000 00	
Expended to March 31, 1915		$ 3,792 71
Balance unexpended March 31, 1915		3,207 29
Total	$ 7,000 00	$ 7,000 00
Honorarium for services as lecturers to 21 school inspectors		$ 2,450 00
Rev. A. Michaud, Lecturer, salary and expenses		617 30
Rev. Abbe Ol. Martin, Provincial Inspector, expenses		133 32
J. Chas. Magnan, District representative, expenses as lecturer		97 84
Oka Institute—		
Special courses for school inspectors		349 90
Circulars		93 50
Seeds		31 85
Incidentals		19 00
Total		$ 3,792 71

6.—District Representatives.

Grant	$ 12,000 00	
Expended to March 31, 1915		$ 3,406 89
Balance unexpended March 31, 1915		8,593 11
Total	$ 12,000 00	$ 12,000 00
District Representatives—		
R. A. Rousseau, salary and disbursements		$ 586 42
J. C. Magnan, "		676 56
H. Cloutier, "		492 24
A. Raymond, "		541 89
J. M. Leclair, "		481 58
A. Desilets, "		271 24
Alp. Roy, "		30 96
Assistants—		
L. Phil. Gauvin, salary and disbursements		35 00
J. S. Siniard, "		260 75
Incidentals		30 25
Total		$ 3,406 89

7.—*Experimental Union*

Grant	$ 2,000 00	
Expended to March 31, 1915	.....	$ 500 00
Balance unexpended March 31, 1915	.....	1,500 00
Total	$ 2,000 00	$ 2,000 00
Grant to Union		$ 500 00

8.—*Clover and Alfalfa.*

Grant	$ 2,000 00	
Expended to March 31, 1915	.....	$ 1,999 97
Balance unexpended March 31, 1915	.....	0 03
Total	$ 2,000 00	$ 2,000 00
F. X. St. Pierre, Conductor of Experiments, salary and disbursements		$ 251 70
Mgr. Francoeur, Conductor of Experiments, salary and disbursements		234 69
Jos. Barbeau, travelling expenses		27 74
Leandre Francoeur, salary and disbursements		206 94
Leo. Brown, Instructor, expenses		339 25
Disbursements *re* plots, including rental		782 49
Incidentals		57 16
Total		$ 1,999 97

9.—*Seed Selection.*

Grant	$ 4,000 00	
Expended to March 31, 1915	.....	$ 2,001 01
Balance unexpended March 31, 1915	.....	1,998 99
Total	$ 4,000 00	$ 4,000 00
L. Lavallée, salary and disbursements		$ 403 65
Orens Garneau, "		136 64
Jos. Barbeau, "		192 27
L. E. Kronstrom, "		207 48
J. Art. Paquet, "		150 00
L. Francœur, "		173 66
Ovila Roberge, "		40 00
Materials, equipment, publications and disbursements to sundry persons		697 31
Total		$ 2,001 01

10.—*Bee-keeping.*

Grant	$ 8,000 00	
Expended to March 31, 1915	.....	$ 8,000 00
Total	$ 8,000 00	$ 8,000 00
Inspectors, instructors, lecturers—		
Dr. L. J. Comire, salary and disbursements		$ 1,066 55
Elzeard Girard "		1,021 60
Bernard Brissette, "		1,016 70
A. A. Comire, "		1,072 47
Luc. Dupuis, "		792 55
Hector Béland, "		509 86
Assistants—		
O. Comire, "		299 10
J. L. A. Dupuis, "		445 35
Nap. Piette, "		256 22
Edm. Brissette, "		358 25
Donat Rochefort, "		393 20
J. H. Comire, "		299 25
P. Aug. Dupuis, Director, fruit stations		456 90
Sundry payments		12 00
Total		$ 8,000 00

11.—Tobacco.

Grant	$ 3,000 00	
Expended to March 31, 1915	.....	$ 2,433 22
Balance unexpended March 31, 1915	.....	566 78
Total	$ 3,000 00	$ 3,000 00

Jos. Gagné, instructor, salary	375 00
Land and Building for tobacco-curing at St. Cesaire	1,771 61
Field disbursements	286 61
Total	$ 2,433 22

12.—Dairying.

Grant	$ 17,000 00	
Expended to March 31, 1915	.....	$ 12,458 71
Balance unexpended March 31, 1915	.....	4,541 29
Total	$ 17,000 00	$ 17,000 00

Inspectors, Cheese Factories and Creameries—		
G. St. Pierre, salary and disbursements		$ 1,339 64
C. E. Standish, "		1,073 89
A. N. Labrie, "		1,306 61
J. P. Bernard, "		1,025 44
Jos. Choumard, "		992 19
J. E. Gaudet, "		467 66
Jos. Gour, "		1,058 54
J. G. Heroux, "		1,330 97
Art. Moissette, "		1,032 57
J. A. Talbot, "		1,297 34
Leo. Trudel, "		1,208 25
Ls. Bibeau, experimenter and cheese-maker at Dairy School, travelling expenses		73 50
Incidentals, travelling	$106 46	
apparatus	145 65	252 11
Total		$ 12,458 71

13.—Underdrainage.

Grant	$ 8,000 00	
Expended to March 31, 1915	.....	$ 1,043 62
Balance unexpended March 31, 1915	.....	6,956 38
Total	$ 8,000 00	$ 8,000 00

G. E. Embergley, salary and disbursements	$ 51 83
C. J. Lynde, superintendent, salary	22 58
A. Belzile, expenses	125 80
F. N. Savoie, superintendent, expenses	37 95
Chs. Laricholiere, "allocation"	12 50
Implements, instruments and supplies	537 96
Drainage work	250 00
Publications	5 00
Total	$ 1,043 62

14.—Domestic Science.

Grant	$ 10,000 00	
Expended to March 31, 1915	.....	$ 6,050 33
Balance unexpended March 31, 1915	.....	3,949 67
Total	$ 10,000 00	$ 10,000 00

14.—Domestic Science—Continued.

Grant to 17 schools	$ 5,300 00
Grant special	170 00
Rev. Abbe Ol. Martin, Provincial Inspector, salary and disbursements	512 78
Chas. Plamondon, school inspector *re* lectures	60 00
Publications	7 55
Total	$ 6,050 33

15.—Maple Sugar.

Grant	$ 3,000 00	
Expended to March 31, 1915	.....	$ 2,336 44
Balance unexpended March 31, 1915	.....	663 56
Total	$ 3,000 00	$ 3,000 00

Publication "Maple Sugar and Syrup"		$ 863 35
Other publications		96 09
Alex. Boulduc, Superintendent Beauceville maple sugar school, disbursements		150 00
J. L. A. Dupuis, Superintendent, Ste. Louise school—		
Disbursements	$ 100	
Board students	340	
Hon. and expenses	112	
		552 00
Alf. Lebrun, Inspector, travelling		25 00
School building, Beauceville		300 00
" Ste. Louise		350 00
Total		$ 2,336 44

16.—Lectures.

Grant	$ 6,409 16	
Expended to March 31, 1915	.....	$ 5,485 50
Balance unexpended March 31, 1915	.....	923 66
Total	$ 6,409 16	$ 6,409 16

To Macdonald college, *re* demonstration train (1913)	$ 109 46
Materials, labour, etc., *re* demonstration train (1913)	229 30
Publications and printing	162 19
A. L. Gareau, lecturer, animal husbandry	1,050 00
Wm. Vincent, salary and disbursements	373 28
J. G. Robitaille, advance	100 00
Jos. Barbeau, salary	87 50
M. A. P. Hamal, lecturer, salary and disbursements	101 75
J. H. Comire, salary	45 50
P. Gaudreault, advance	100 00
Alf. C. St. Pierre, lecturer, salary and disbursements	583 52
F. X. Gosselin, lecturer, hon. and disbursements	218 90
Rev. H. Bois, lecturer, vegetable culture	164 85
Luc Dupuis, lecturer, bee-keeping, hon. and disbursements	438 50
J. L. A. Dupuis, lecturer, sugar-making, " "	503 10
J. G. Bouchard, lecturer, soil chemistry " "	353 00
G. St. Pierre, " " "	130 45
Ph. Rheault, " " "	231 00
Jos. Pasquet, " " "	8 75
F. N. Savoie, lecturer, drainage and cereals, hon. and disbursements	90 00
J. A. Desilets, lecturer, drainage and cereals, hon. and disbursements	75 00
J. Art. Paquet, lecturer, drainage and cereals, hon. and disbursements	200 00
Various persons, travelling expenses	129 45
Total	$ 5,485 50

AGRICULTURAL COLLEGE AND SCHOOLS.

The following are the detailed statements of expenditures of the full grants paid to the three institutions for the college year 1914-15.

MACDONALD COLLEGE.

STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR YEAR ENDING MARCH 31, 1915.

Debit balance, year ending March 31, 1914		$ 107 89
Disbursements—		
Animal husbandry	$ 2,672 72	
Bacteriology	331 95	
Biology	668 53	
Cereal husbandry	2,154 83	
Chemistry	886 69	
Horticulture	1,938 44	
Household science	1,418 61	
Physics	831 75	
Poultry	1,880 62	
Veterinary science	1,206 61	
General	3,932 80	
Short courses	651 21	
		18,574 76
Total		$ 18,682 65
Receipts—		
April 30, 1914, Department of Agriculture	$ 10,000 00	
August 14, 1914	5,000 00	
November 9, 1914	5,000 00	
		$ 20,000 00
Balance credit		$ 1,317 35

LIST OF STAFF EMPLOYED BY MACDONALD COLLEGE UNDER THE AGRICULTURAL INSPECTION ACT.

Paul A. Boving, Cand. Phil. in charge of Root crop investigation	$ 2,000 00
A. Savage, B.S.A., D.V.M., Veterinarian	1,650 00
A. A. Macmillan, B.S.A., in charge of Sheep husbandry	1,500 00
E. M. Duporte, B.S.A., M.Sc., Biology	1,000 00
J. V. Dupre, A.C.G.I., Physics	800 00
A. McLaurin, B.S.A., Animal husbandry	1,040 00
G. J. VanZoeren, Chemistry (A.B.)	800 00
*E. G. Wood, Demonstrator, Huntingdon	250 00
*W. G. Sutton, Demonstrator, Shawville	275 00
*T. H. Biggar, Demonstrator, Richmond	275 00
*G. C. Hay, Demonstrator, Cowansville	275 00
*G. C. Boyce, B.S.A., Demonstrator, Ayer's Cliff	300 00
*J. H. King, B.S.A., Cookshire	300 00
*L. C. McQuat, B.S.A., Lennoxville	300 00
*L. J. Westbrook, B.S.A., Shawville	300 00
Miss Frederica Campbell, Demonstrator, Homemakers' Clubs, Que.	900 00
W. Graham, Shepherd	540 00
Total	$ 12,505 00

SCHOOL OF AGRICULTURE—STE. ANNE DE LA POCATIÈRE.

	Salary.
M. P. Boulet (assistant chef de pratique)	$ 600 00
M. l'abbé A. Letourneau	400 00
M. l'abbé E. Bernier	300 00

*Summer only.

SCHOOL OF AGRICULTURE—STE. ANNE DE LA POCATIÈRE.—*Continued.*

M. F. N. Savoie		$ 1,000 00
M. Georges Bouchard		500 00
M. Albert Jalbert (Fruit Growing)		500 00
M. Orens Garneau (Bacon)		262 48
M. F. Dionne (Bacon)		150 85
M. L. Alfred Gosselin (Horticulture)		400 00
M. E. Lizolte (Dairying)		500 00
		$ 4,613 33
Towards board of pupils		1,230 93
Towards wages of servants		550 00
Expenses of following branches—		
Fruit growing	$ 60 00	
Horticulture	100 00	
Bacon industry	786 67	
Dairying	740 00	
Field work	600 00	
Apiculture	200 00	
Poultry	400 00	
Conserves	300 00	
		3,186 67
Short courses		405 50
Library, books, magazines, etc		303 57
Demonstration, fields		1,550 00
Chemical laboratory		150 00
Travelling expenses		100 00
Enlargement of main building		6,000 00
Total		$ 18,090 00

OKA AGRICULTURAL INSTITUTE.

	Salaries (in whole of in part).	
Chef de pratique		$ 1,000 00
M. H. Nagant (chemistry)		800 00
F. Queva (Chemistry and Microbiology)		670 00
M. J. Dollo (Sciences)		670 00
R. P. Maur (Génie rural)		800 00
M. A. Dauth (Veterinary)		300 00
R. P. Athanese (Horticulture)		250 00
R. P. Maur (Bee-keeping)		250 00
R. P. Leopold		378 23
R. F. Roch		300 00
Aumonier		400 00
M. P. Roy		300 00
M. F. Letourneau (Entomology)		300 00
M. M. Lavoie (Drainage)		115 00
M. J. E. Ponton (May and June)		273 50
M. J. Arscott (Horticulture)		200 00
R. P. Honore (Fruit Growing)		200 00
M. A. Lafrance (Fruit Growing)		300 00
R. F. Wilfrid (Poultry)		500 00
R. P. Directeur		800 00
M. J. Payer (Secretary)		800 00
Other instructors		438 23
Total		$ 10,044 96
Expenses of following branches—		
Poultry	$ 100 00	
Bee-keeping	100 00	
Fruit growing	200 00	
Conserves	100 00	
		500 00
Short courses		1,168 28
Library		90 00
Travelling and miscellaneous		206 76
Experimental Field		1,100 00
Towards board of pupils		1,800 00
Towards house expenses		1,000 00
Enlargement of College building		5,000 00
Total		$ 20,910 00

SESSIONAL PAPER No. 15c

Federal Subsidy of 1913-14.

Summary financial statement to March 31, 1915.

Section No.	Classification.	Grant, 1913–1914.	Expended to Mar. 31, 1915.
		$ cts.	$ cts.
1	Fruit Culture	15,919 24	15,919 24
2	Bacon Industry	10,000 00	10,000 00
3	Poultry-keeping	17,000 00	17,000 00
4	Schools of Agriculture	59,850 00	59,850 00
5	Agricultural Instruction in Schools	3,000 00	3,000 00
6	District Representatives	10,000 00	10,000 00
7	Experimental Union	2,000 00	2,000 00
8	Demonstrations in Clover and Alfalfa	4,039 32	4,039 32
9	Seed and Field Crops	1,190 54	1,190 54
10	Apiculture	5,000 00	5,000 00
11	Tobacco Industry	3,000 00	3,000 00
12	Dairy Industry	7,000 00	7,000 00
13	Drainage	8,000 00	8,000 00
14	Domestic Science	7,000 00	7,000 00
15	Maple Sugar Industry	4,000 90	4,000 90
16	Lectures and Demonstration Train	2,482 40	2,492 40
	Totals	$159,482 40	$159,482 40

Details of Expenditure of Subsidy of 1913-14.

1.—Fruit Culture.

Grant, 1913-14	$ 15,919 24	
Expended to March 31, 1915		$ 15,919 24
Total	$ 15,919 24	$ 15,919 24
L'Abbé V. A. Huard, Prov. Entomologist, salary		$ 944 00
J. H. Lavoie, Chief Fruit Branch, salary and expenses		498 60
P. Reid, Supt. Demonstration orchards, salary and expenses		1,035 66
Solyme Roy, Chief Arboriculturist, salary and expenses		336 30
Jos. Barbeau, Commissioner, salary and expenses		335 10
Instructors, lecturers, salary and expenses—		
Alf. Label	$ 997 85	
Phil. Roy	235 31	
Phil. Hamel	793 40	
D. J. Wood	305 60	
J. M. Talbot	218 84	
F. X. Josselin	464 80	
M. A. P. Hamel	275 35	
Sundry persons, services and expenses	944 84	
		4,235 99
		$ 7,385 65
Fruit trees, etc.		1,593 73
5,000 "Fruit Culture"		1,517 61
Printing		442 52
Furniture		139 98
Exhibits		652 68
Leases, labour, supplies, equipment, incidentals, allowances, etc.		4,187 07
Total		$ 15,919 24

2.—Bacon Industry.

Grant, 1913-14	$ 10,000 00	
Expended to March 31, 1915	.....	$ 10,000 00
Total	$ 10,000 00	$ 10,000 00
Prof. A. Hansen, salary 7 months		$ 1,750 00
" expenses		296 72
A. C. St. Pierre, Abattoir manager, salary 14 months		1,050 00
" " expenses		1,580 35
Abattoir at St. Valier—		
Purchase of lot and plans		305 28
Construction, Jos. Gosselin		4,019 43
Two pickle-pumps, Oka and Ste. Anne de la Pocatière		222 96
Miscellaneous		775 26
Total		$ 10,000 00

3.—Poultry Work.

Grant, 1913-14	$ 17,000 00	
Expended to March 31, 1915	.....	$ 17,000 00
Total	$ 17,000 00	$ 17,000 00
Poultry department Oka Institute		$ 3,298 11
Rev. Brother Liquori, Provincial Supt. of Poultry, salary and expenses		1,501 57
Leon Picard, Asst. Provincial Supt. of Poultry, salary and expenses		642 40
J. G. Morgan, Montreal		1,303 93
Four travelling instructors		667 63
Bulletins and printing		2,274 45
Macdonald College, egg distribution		250 00
Exhibitions, Quebec and Sherbrooke		906 86
Poultry demonstrations stations		3,422 85
Incubators (4)		964 00
Miscellaneous expenses		1,748 20
Total		$ 17,000 00

4.—Schools and Colleges of Agriculture.

Grant, 1913-14	$ 59,850 00	
Expended to March 31, 1915	.....	$ 59,850 00
Total	$ 59,850 00	$ 59,850 00
Macdonald College		$ 20,000 00
Oka Agricultural Institute		19,500 00
Agricultural School of Ste. Anne de la Pocatière		18,250 00
Orphanage, Notre Dame des Champs, Paspebiac		400 00
Agricultural Orphanage of St. Joseph at Vauvert		700 00
Total		$ 59,850 00

5.—Agricultural Instruction in Academies.

Grant, 1913-14	$ 3,000 00	
Expended to March 31, 1915	.....	$ 3,000 00
Total	$ 3,000 00	$ 3,000 00
Travelling expenses of school inspectors		$ 975 40
O. E. Delaire, expenses		100 00
Rev. A. Michaud, salary and expenses		589 30
Rev. Abbe O. Martin, salary and expenses		128 08
Charts, bulletins, etc		615 42
Miscellaneous		592 00
Total		$ 3,000 00

6.—*District Representatives.*

Grant, 1913-14	$ 10,000 00	
Expended to March 31, 1915	.....	$ 10,000 00
Total	$ 10,000 00	$ 10,000 00

Travelling expenses, salaries, office expenses of district representatives	$ 9,436 77
Furniture and equipment	460 15
Poultry appliances for school inspectors	103 08
Total	$ 10,000 00

7.—*Experimental Union.*

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1915	.....	$ 2,000 00
Total	$ 2,000 00	$ 2,000 00

Grant to Experimental Union, Oka	$ 2,000 00

8.—*Alfalfa and Clover Demonstrations.*

Grant, 1913-14	$ 4,039 32	
Expended to March 31, 1915	.....	$ 4,039 32
Total	$ 4,039 32	$ 4,039 32

Mag. Francoeur, Conductor, salary and disbursements	$ 1,071 61
F. X. St. Pierre, Assistant Conductor, salary and disbursements	252 00
Leandre Francoeur, Conductor, salary and disbursements	211 10
Jos. Barbeau, Commissioner, salary	92 24
Leo Brown, Instructor, expenses	852 05
	$ 2,479 00
Supplies, furnishings and incidentals	361 38
Seed	321 13
Typewriter	130 00
Rental of plots	482 81
Allowance to "regisseurs"	265 00
Total	$ 4,039 32

9.—*Seed Selection and Field Crop Demonstrations.*

Grant, 1913-14	$ 1,190 54	
Expended to March 31, 1915	.....	$ 1,190 54
Total	$ 1,190 54	$ 1,190 54

Jos. Barbeau, Commissioner, salary	$ 242 50
L. Lavallee, salary	133 34
Charles Laricheliere, salary	25 00
Expenses, sundry officers	79 70
Rent	150 00
One "Crible Separateur," freight and duty	297 00
Ten thousand copies "Culture des Cereales"	263 00
Total	$ 1,190 54

10.—*Bee-keeping.*

Grant, 1913-14	$ 5,000 00	
Expended to March 31, 1915	.....	$ 5,000 00
Total	$ 5,000 00	$ 5,000 00

10.—Bee-keeping—Continued.

Salaries and expenses, Instructors and Foul-brood Inspectors—		
L. J. Comire, Yamaska West, Yamaska		$ 917 34
J. H. Comire, Montreal		297 50
L. J. A. Dupuis, village des Aulnaies, L'Islet		698 35
D. Rochefort, Becancour, Nicolet		192 50
Elz. Girard, St. Monique, Nicolet		516 50
P. A. Dupuis, Village des Aulnaies, L'Islet		312 90
O. Comire, St. Francois du Lac, Yamaska		209 90
Hector Beland, Louiseville, Maskinonge		996 26
L. F. Beland, Grand Pre, Maskinonge		334 75
Edm. Brissette, St. Barthelemi, Berthier		364 00
Exhibitions		150 00
Total		$ 5,000 00

11.—Tobacco Industry.

Grant, 1913-14	$ 3,000 00	
Expended to March 31, 1915	.....	$ 3,000 00
Total	$ 3,000 00	$ 3,000 00
Exhibition expenses		$ 502 36
Bulletins, "La Culture du Tabac"		2,000 00
Jos. Gagne, Instructor, salary, May, June, July, 1914		225 00
Miscellaneous		272 64
Total		$ 3,000 00

12.—Dairying.

Grant, 1913-14	$ 7,000 00	
Expended to March 31, 1915	.....	$ 7,000 00
Total	$ 7,000 00	$ 7,000 00
Salaries and expenses of Inspectors and Lecturers		$ 6,917 80
Allowances to factory-managers attending Short Courses		29 12
Incidentals		53 08
Total		$ 7,000 00

13.—Underdrainage.

Grant, 1913-14	$ 8,000 00	
Expended to March 31, 1915	.....	$ 8,000 00
Total	$ 8,000 00	$ 8,000 00
Jos. Barbeau, Commissioner, salary and expenses		$ 569 00
John Drolet, Instructor, "		576 44
Wilfrid Giroux, Instructor, "		651 77
C. J. Lynde, Superintendent, "		353 10
F. N. Savoie, Superintendent, "		488 98
Machine operators, wages and expenses		224 09
Soil Surveys—		
Nine students, five months at $50 and expenses		3,787 40
Repairs, transportation of machines, etc		613 51
Printing and advertising		128 04
Ten thousand copies "Practical Draining"		607 67
Total		$ 8,000 00

14.—Domestic Science.

Grant, 1913-14	$ 7,000 00	
Expended to March 31, 1915	.....	$ 7,000 00
Total	$ 7,000 00	$ 7,000 00

14.—Domestic Science—Continued.

Teachers' Courses, St. Pascal and Roberval, 1913-14		$ 500 00
Grants of $300 to 4 schools in 1912-13	$ 1,200 00	
Grants of $300 to 16 schools in 1913-14	4,800 00	
Grant of $100 to 1 school in 1913-14	100 00	
		6,100 00
Travelling expenses, school inspectors		241 45
Printing and pamphlets		127 03
Miscellaneous		31 52
Total		$ 7,000 00

15.—Maple Sugar Industry.

Grant, 1913-14	$ 4,000 90	
Expended to March 31, 1915	.....	$ 4,000 90
Total	$ 4,000 90	$ 4,000 90

Beauceville school	$ 1,772 75
St. Louise school	1,635 10
La Minerve school	548 05
Miscellaneous	45 00
Total	$ 4,000 90

16.—Lectures and Demonstration Trains.

Grant, 1913-14	$ 2,482 40	
Expended to March 31, 1915	.....	$ 2,482 40
Total	$ 2,482 40	$ 2,482 40

Expended in providing and installing exhibits by Macdonald College, in printing and incidentals, and for travelling expenses of College Professors and others giving instruction.. $ 2,482 40

Agricultural Aid Grant, 1912.

SUMMARY FINANCIAL STATEMENT.

Section No.	Classification.	Grant.	Expended to June 30, 1913.	Expended subsequently.	Total.
		$ cts.	$ cts.	$ cts.	$ cts.
1	Fruit Culture	23,460 20	21,863 78	1,596 42	23,460 20
2	Bacon Industry	10,000 00	3,627 51	6,372 49	10,000 00
3	Poultry-Keeping	4,000 00	3,605 61	394 39	4,000 00
4	Poultry-Keeping, Co-operative subsidies	10,000 00	8,893 92	1,106 08	10,000 00
5	Agricultural Colleges	20,000 00	18,374 97	1,625 03	20,000 00
6	Experimental Union	2,000 00	1,500 00	500 00	2,000 00
7	Live Stock (Importations)	3,000 00	3,000 00		3,000 00
8	Clover and Alfalfa	15,539 80	13,961 94	1,577 86	15,539 80
9	Drainage	20,000 00	11,125 39	8,874 61	20,000 00
10	Chemical Laboratories	10,000 00	6,815 16	3,184 84	10,000 00
11	Dairy, Premiums and Inspection	3,500 00	1,376 55	2,123 45	3,500 00
12	Dairy Ass'n Provincial	2,000 00	2,000 00		2,000 00
13	Tobacco	10,000 00	9,896 35	103 65	10,000 00
14	Veterinary Instruction—Laboratory	3,000 00		3,000 00	3,000 00
15	Demonstration Trains and Lectures	2,982 40	2,962 41	19 99	2,982 40
	Totals	139,482 40	109,003 59	30,478 81	139,482 40

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1913, 1914, 1915 AND ESTIMATED EXPENDITURE FOR 1916.

Service.	1913 to June 30.	1914 to June 30.	1914–15 to June 30.	Estimated 1915–16 to June 30.
	$ cts.	$ cts.	$ cts.	$ cts.
Civil Government Salaries and Contingencies	41,533 34	45,220 96	45,500 00	45,600 00
Agricultural Schools	20,208 39	18,534 99	29,863 09	30,000 00
House-keeping Schools	10,000 00	18,500 00	10,290 29	16,000 00
Agricultural Societies	120,614 08	164,551 98	146,296 56	100,000 00
Farmers' Clubs or Agricultural Circles, including grant to S. Shore Railway	90,851 83	99,650 00	97,000 00	110,000 00
Council of Agriculture	4,529 03	3,665 83	2,787 99	3,000 00
Horticultural and Agricultural Societies, Montreal and Provincial	1,000 00	1,000 00	1,000 00	1,500 00
Veterinary Instruction	5,994 96	5,500 00	4,772 68	5,500 00
Dairying	74,441 50	76,000 00	67,676 14	98,410 00
Provincial Laboratory	2,000 00	1,540 24	2,000 00	2,000 00
Lectures on Agriculture	6,537 56	7,029 44	5,406 09	9,000 00
Fruit Growing	11,856 29	10,865 48	6,580 36	10,000 00
Poultry Raising	3,000 00	3,000 00	2,099 14	3,000 00
Journal of Agriculture	29,000 00	29,000 00	27,000 00	27,000 00
Agricultural Merit	4,000 00	2,607 65	3,270 38	3,500 00
Exhibitions	32,000 00	32,000 00	31,000 00	32,000 00
Miscellaneous	100 00	100 00	100 00	100 00
School of Agriculture, Ste. Anne de la Pocatière.—				
Towards construction	10,000 00			
Towards maintenance	10,000 00	10,000 00		
Totals	477,666 98	528,766 57	482,642 72	496,610 00

MANITOBA.

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

Education work in bee-keeping	$ 1,500 00
Demonstration trains	7,000 00
Demonstration farms	12,000 00
Courses of lectures among farmers in field and animal husbandry	8,000 00
Lectures and demonstrations on the feeding, killing and dressing of all kinds of poultry	2,000 00
Weed eradication, demonstrations in killing weeds	1,000 00
Educational work in connection with co-operative marketing of farm products	3,000 00
Demonstration plots of alfalfa	1,000 00
Boys' and girls' farm clubs	3,000 00
Experiments in tile draining	1,000 00
Travelling instructor on home economics, including expenses and equipment	4,500 00
Travelling instructors in dairying	5,000 00
Excursions to the Agricultural college and Experimental Farm	1,000 00
Demonstrations and instruction, vegetable growing and other horticultural subjects	2,000 00
Publication of bulletins on above subjects	3,000 00
Instruction in farm mechanics in rural schools	3,000 00
Miscellaneous	75 45
Total	$ 58,075 45

OUTLINE OF WORK PERFORMED.

Field Inspectors.—In the autumn of 1914, the Provincial Department prepared to enlarge the extension work being carried on under the Agricultural Instruction Act by introducing a system of field or district representatives. To fit men for the work, a special course of instruction was given at the Agricultural College. The field representatives will not only provide technical assistance in extending approved methods of cultivation and farm management, but through them marketing facilities will be improved. These officers will administer the Noxious Weeds Act, and by keeping in close touch with the work of demonstration farms, be able to advise in regard to the most approved methods of land-cleaning, etc. Fourteen demonstration farms have already been established, and more will be put in operation, and, it is expected that, with the additional help that the district representatives will afford, the agriculture of the province will rapidly be placed on a much higher plane than it has as yet occupied.

In the spring of 1915 the following college graduates were appointed: Lester V. Lohr, W. T. G. Wiener, H. F. Danielson, Nelson S. Smith, and W. J. Stone. Each is assigned a district for the summer months. Other representatives will be appointed as required and as suitable men become available.

Demonstration Farms.—Of the twenty farms that have been planned for, twelve were located in 1913 and three have since been added, one of 70 acres adjoining the lake at Killarney, one of 45 acres in the Rose Hill district, Southern Manitoba, and another of 7 acres at the Manitoba Agricultural College. The larger portion of the Killarney farm will be used to demonstrate the growing of hardy fruits and the balance operated as a demonstration in the growing of grains and grasses, and in drainage and crop rotation. The farms are to cover all the different types of soil in the province.

The soil at Rose Hill is a sandy loam with a light gravel subsoil, and as this type of land is not infrequently met with in the province, it has been deemed advisable to demonstrate a rotation suitable for it. Ten acres will be devoted to the production of seed of early types of field corn, and the balance to the growing of cereals.

The land on which the farms are located is in all cases leased under agreement with the owner (see page 97, Report 1914) except that of the Killarney Farm, which was purchased out of the federal grant at a cost of $3,875. The charges against the appropriation include fencing and cost of work performed.

The College and Baldur Farms were the only ones fully seeded in 1914. The others were cleaned up and summer-fallowed ready for seeding in the spring of 1915.

Alfalfa Plots.—Twenty of these have been established, and form part of the demonstration farms. The object is not only to induce the sowing of alfalfa of the right varieties but to obtain a supply of home-grown seed. At Neepawa, the Grimm variety has proved entirely hardy.

Demonstration Train.—In order to carry the agricultural college instruction to the farmers who are unable to attend that institution, it has been the custom during the past few years to despatch Better-farming Specials in June and July over all railway lines in Manitoba. These trains are fully equipped for practical demonstrations and manned by members of the College staff. The Canadian Pacific train particularly appealed to young people with its moving pictures, home economics display, exhibits of birds and insects. An information bureau, where all questions relating to the College and its work were answered, was a feature. A large plaster model of the College and grounds attracted attention. A car of live stock was also included. The Canadian Northern special, while differing from the Canadian Pacific train in some respects, was equally interesting and complete, special features being made of farm machinery and mechanical equipment demonstrations, poultry demonstrations, and home economics demonstrations. In fact actual demonstration was strongly emphasized on this train and many working models were carried.

Boys' and Girls' Clubs.—These clubs were first organized under the Extension Service of the Agricultural College, which still assists in the movement. Potatoes, corn and poultry are raised from seed, and settings of eggs supplied, and independent fairs are held at which these and other articles, including woodwork, sewing, vegetables, grains and flowers, are exhibited. The enrolled membership in 1915 was 5,000. The organization is not confined to children in attendance at school, but all between the ages of ten and sixteen, inclusive, may take part.

The Club Fair at Roland was the first of more than forty of these fairs held in the autumn of 1914. The attendance on the second day was over 800, and it was a greater success in every way than the successful event of the previous year when the movement was inaugurated. Not only do these clubs prepare the next generation of farmers and home managers for their future duties, but they also have a direct influence upon the parents, who are taking a keen interest in the educational work.

One of the conditions imposed in organizing the clubs is that the work must be done on the home farm or garden, but much of the organization is done by the teachers, and practically every other interest in the district is behind the boys and girls in their farming operations and is ready to help them both in the matter of suggestions and making provision for attractive prize lists.

Each member knows all about the fine points not only of his own chickens, but of those belonging to his companions as well, and there are hundreds of separate pens throughout the province, and the juvenile owners of these pens are taking particular care that the strain is kept pure.

The impetus given to fodder-corn growing is most pronounced. It is seen growing now in all parts of the province, whereas a couple of years ago only a few patches

were in evidence. To such an extent has it been grown and found satisfactory that the Engineering Department of the college is preparing plans for the construction of silos, as it is recognized that next year the demand will be particularly large in this respect. Last year the potato plots proved a splendid lesson in the advantage of cultivation for the conservation of moisture.

Previously, the girls were obliged to compete with the boys in these contests if they wished to take part at all, and they held their own to a remarkable degree, winning a great many prizes with their poultry and potatoes, and even in the pig-raising contest. This year, however, special contests in bread-making, sewing, canning and preserving have beeen added for the girls, and farm mechanics for the boys, making eight contests in which club members may engage.

The material supplied by the Department of Agriculture was as follows: One setting of pure bred eggs to one member of each family; ten pounds of Carman No. 1 potatoes to each member, a quarter pound of each of the following varieties of fodder corn, Northwestern Dent, Longfellow and Minnesota 13, a half pound each of beans and peas for the canning and preserving contests, plans for a dozen projects in farm mechanics, and notebooks in which a full account of the work done is kept.

From last year's winners a dozen boys were chosen as the nucleus of a junior Canadian seed growers' association. Sufficient second generation Marquis wheat was secured from Seager Wheeler's famous prize winning stock to seed one-third of an acre, and the Field Husbandry Department of the college has prepared careful instructions in handling not only this year's plot, but in summer fallowing for next year's crop, and it is probable that the methods suggested here will have a wider application on these farms.

Next year it is proposed to arrange for one acre contests of various kinds for the members of the clubs who reach a certain standard in this year's competitions, and to supply eggs only to the new clubs, as it is felt that this year's clubs will already have made a pretty good start in raising poultry and will have their own supplies.

In the majority of cases the club organizers are the principals of schools, but they declare that the extra work done by them in connection with the boys' and girls' clubs is more than made up for by the increased attendance and renewed interest taken by the pupils in their other work. The fact that these contests are carried on on the home farm has made the clubs the connecting link between the home and the school. It has led the parents to see that the teachers are interested in the children outside of school hours, and in turn the parents have become more interested in the work of the school in school hours. Wherever boys' and girls' clubs have been organized, the people are unanimous in saying that no movement has had a greater effect in arousing interest in better farming.

School Fairs.—In 1914, some thirty-five school fairs were held, including exhibits from 100 schools. There were entries from 2,500 children, and the attendance was estimated at 10,000. Some of these fairs are held under the direction of the boys' and girls' clubs, others under a Junior Agricultural Society, some under a committee of the teachers and trustees of the municipality, and others under the teachers and trustees of the individual school. In connection with some school fairs, sports were held during the day, and a concert in the evening.

Home Economics.—Nine new home economics societies and several hundred new members were added in 1914, bringing the membership up to 1,675. Much useful work has been done in placing unemployed girls, in introducing social improvements, in the creation and care of beauty spots in localities, and above all in making articles of comfort for the refugee and the wounded. The societies in fact have been very generally employed in Red Cross work. The work is assisted by a grant of 50 cents for each member up to twenty in number and 25 cents for every additional member. The Department also contributed 240 books to the travelling librairies of the societies. Four

of these libraries exist, each of which contains from twelve to fifteen books on home economics, which are kept in constant circulation between the different societies. The superintendent reports that progress is being made not only in educational work but in everything looking to the improvement of home and community conditions. Several societies took up the courses arranged in Home Nursing, Hygiene, Foods, Sewing and Laundry-work. Other special features were work in connection with the Better-farming Specials and short courses in Public schools. At the convention held in February, 1915, resolutions were passed urging medical inspection in schools throughout the province, and advocating increased attention to the teaching of agriculture and domestic science in the schools.

Instruction in Farm Mechanics in Rural Schools.—In this direction a beginning has been made by granting funds to rural schools for the purchase of blacksmith outfits. Such instruction is given as will enable boys to make repairs with the use of a small farm forge.

Educational Work in Bee-keeping.—Considerable interest is being shown in this industry with the re-organization of the Bee-keepers' Association and the appointment of a provincial apiarist in April, 1914. This officer, who is located at the College, conducts experiments, inspects apiaries, and gives lectures and demonstration. He will also introduce apiculture at the demonstration farms.

SUMMARY FINANCIAL STATEMENT, FEDERAL SUBSIDY OF 1914-15, FROM APRIL 1, 1914, TO MARCH 31, 1915.

Section No.	Classification.	Unexpended Balance Apr. 1, 1914.	Grant 1914-15.	Total.	Expended to Mar. 31, 1915.	Unexpended Balances March 31, 1915.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1	Bee-keeping	782 00	1,500 00	2,282 00	853 39	1,428 61
2	Demonstration Trains		7,000 00	7,000 00	5,023 58	1,976 42
3	Demonstration Farms	8,993 42	12,000 00	20,993 42	15,969 59	5,023 83
4	Field and Animal Husbandry	3,076 46	8,000 00	11,076 46	1,757 15	9,319 31
5	Poultry Husbandry	1,130 75	2,000 00	3,130 75	1,600 75	1,530 00
6	Weed Demonstrations	500 00	1,000 00	1,500 00	330 75	1,169 25
7	Produce Marketing	3,000 00	3,000 00	6,000 00	1,944 75	4,055 25
8	Alfalfa Plots	1,025 89	1,000 00	2,025 89	224 58	1,801 31
9	Children's Clubs	972 03	3,000 00	3,972 03	2,537 28	1,434 75
10	Agricultural Instructors	1,725 00		1,725 00		1,725 00
11	Drainage	928 69	1,000 00	1,928 69	1,299 85	628 84
12	Home Economics—Instructors	1,751 85	4,500 00	6,251 85	4,353 99	1,897 86
13	Home Economics—Equipment	239 96		239 96		239 96
14	Dairying Instructors	604 48	5,000 00	5,604 48	5,377 50	226 98
15	Excursions, College Farms		1,000 00	1,000 00		1,000 00
16	Vegetable and Horticultural Demonstrations	200 00	2,000 00	2,200 00	318 76	1,881 24
17	Bulletins		3,000 00	3,000 00	2,976 25	23 75
18	Farm Mechanics		3,000 00	3,000 00	500 00	2,500 00
19	Miscellaneous	1,938 90	75 45	2,014 35	1,474 98	539 37
	Totals	26,869 43	58,075 45	84,944 88	46,543 15	38,401 73

DETAILS OF EXPENDITURE, APRIL 1, 1914, TO MARCH 31, 1915.

1.—Bee-keeping.

Grant, 1914-15	$ 1,500 00	
Balance forward, April 1, 1914	782 00	
Expended to March 31, 1915		$ 853 39
Balance unexpended March 31, 1915		1,428 61
Total	$ 2,282 00	$ 2,282 00

1.—Bee-keeping—Continued.

R. M. Muckle, Provincial Apiarist, salary		$ 520 00
R. M. Muckle, expenses		259 44
Supplies and equipment		67 99
Incidentals		6 05
Total		$ 853 39

2.—Demonstration Trains.

Grant, 1914-15	$ 7,000 00	
Balance forward, April 1, 1914	.....	$ 358 57
Expended to March 31, 1915	.....	4,665 01
Balance unexpended March 31, 1915	.....	1,976 42
Total	$ 7,000 00	$ 7,000 00

Sundry persons, services and expenses		$ 388 97
Lecturers—		
Laura E. Black	$115 00	
Dr. C. D. McGilvray	92 75	
Eva C. Graham	78 95	
Picture machine operator	89 70	
		376 40
Supplies and equipment		720 87
Printing and advertising		1,068 17
Meals and berths		2,101 45
Incidentals		9 24
Total		$ 4,665 10

3.—Demonstration Farms.

Grant, 1914-15	$ 12,000 00	
Balance forward, April 1, 1914	8,993 42	
Expended to March 31, 1915	.....	$ 15,969 59
Balance unexpended March 31, 1915	.....	5,023 83
Total	$ 20,993 42	$ 20,993 42

Geo. H. Jones, salary and expenses		$ 1,717 15
S. A. Bedford, Deputy Minister, expenses		213 59
G. A. Warrington, Surveyor, salary and expenses		634 65
Labour and board	$ 5,155 76	
Killarney pay sheet	710 18	
		5,865 94
Materials and supplies, fencing, etc.		1,918 96
Killarney farm purchase		3,875 00
Implements		1,291 49
Livery		175 25
Incidentals		277 56
Total		$ 15,969 59

4.—Field and Animal Husbandry.

Grant, 1914-15	$ 8,000 00	
Balance forward, April 1, 1914	3,076 46	
Expended to March 31, 1915	.....	$ 1,757 15
Balance unexpended March 31, 1915	.....	9,319 31
Total	$ 11,076 46	$ 11,076 46

Lecturers, etc.—		
Sundry persons, services and expenses		$ 761 80
Geo. H. Jones, Professor Animal Husbandry, salary	$200 00	
" " " expenses	116 25	
A. Blackstock, Lecturer Animal Husbandry, salary	625 00	
" " " expenses	34 70	
		975 95
Incidentals		19 40
Total		$ 1,757 15

5.—Poultry Husbandry.

Grant, 1914-15	$ 2,000 00	
Balance forward, April 1, 1914	1,130 75	
Expended to March 31, 1915	.....	$ 1,600 75
Balance unexpended March 31, 1915	.....	1,530 00
	$ 3,130 75	$ 3,130 75

J. E. Bergey, Demonstrator, salary and expenses	$ 392 08
Premiums	833 51
Expenses lecturers, etc	75 16
Grant, Brandon Show	300 00
Total	$ 1,600 75

Lectures and demonstrations on the feeding, killing and dressing of all kinds of poultry are carried on among the farmers by an officer of the college.

6.—Weed Demonstrations.

Grant, 1914-15	$ 1,000 00	
Balance forward, April 1, 1914	500 00	
Expended to March 31, 1915	.....	$ 330 75
Balance unexpended March 31, 1915	.....	1,169 25
Total	$ 1,500 00	$ 1,500 00

Separator	$ 32 25
Demonstrations	298 50
Total	$ 330 75

A municipal Weed Inspectors' Short Course and Conference is held at the College each year in June for the purpose of aiding these officers in the performance of their duties.

7.—Produce Marketing.

Grant, 1914-1915	$ 3,000 00	
Balance forward, April 1, 1914	3,000 00	
Expended to March 31, 1915	.....	$ 1,944 75
Balance unexpended March 31, 1915	.....	4,055 25
Total	$ 6,000 00	$ 6,000 00

L. A. Gibson, salary	$ 1,725 00
" expenses	138 60
Printing and stationery	81 15
Total	$ 1,944 75

8.—Alfalfa Plots.

Grant, 1914-15	$ 1,000 00	
Balance forward, April 1, 1914	1,025 89	
Expended to March 31, 1915	.....	$ 224 58
Balance unexpended March 31, 1915	.....	1,801 31
Total	$ 2,025 89	$ 2,025 89

Geo. H. Jones, expenses	$ 32 40
Labour and supplies	192 18
Total	$ 224 58

9.—Children's Clubs.

Grant, 1914-15	$ 2,000 00	
Balance forward, April 1, 1914	972 03	
Expended to March 31, 1915	.....	$ 2,537 28
Balance unexpended March 31, 1915	.....	1,434 75
Total	$ 3,972 03	$ 3,972 03

E. W. Jones, expenses	$ 5 75
A. Blackstock, expenses	21 40
Seeds, eggs, etc	1,235 83
Grants, Boys' clubs	649 49
Printing and stationery	288 88
Express and miscellaneous expenses	335 93
Total	$ 2,537 28

11.—Drainage.

Grant, 1914-15	$ 1,000 00	
Balance forward, April 1, 1914	928 69	
Expended to March 31, 1915	.....	$ 1,299 85
Balance unexpended March 31, 1915	.....	628 84
Total	$ 1,928 69	$ 1,928 69

Materials and supplies	$ 487 55
Labour, wages, board	797 50
Miscellaneous	14 80
Total	$ 1,299 85

12.—Home Economics—Instructors.

Grant, 1914-15	$ 4,500 00	
Balance forward, April 1, 1914	1,751 85	
Expended to March 31, 1915	.....	$ 4,353 99
Balance unexpended March 31, 1915	.....	1,897 86
Total	$ 6,251 85	$ 6,251 85

Miss Gowsell, Instructor, salary and expenses	$1,946 95	
Miss E. Crawford, Instructor, salary and expenses	500 75	
Mrs. Salisbury, Superintendent, " "	230 15	
Mrs. H. W. Drayton, expenses	100 00	
Sundry persons, expenses	80 05	
		$ 2,857 90
Library equipment		261 29
Grants		830 50
Prizes		150 00
Certificates		80 00
Expenses to conventions		71 05
Supplies and Utensils		78 50
Miscellaneous		24 75
Total		$ 4,353 99

14.—Dairying Instructors.

Grants, 1914-15	$ 5,000 00	
Balance forward, April 1, 1914	604 48	
Expended to March 31, 1915	.....	$ 5,377 50
Balance unexpended March 31, 1915	.....	226 98
Total	$ 5,604 48	$ 5,604 48

4.—Dairying Instructors—Continued.

J. W. Crowe, Instructor, salary	$ 2,400 00
" expenses	800 95
E. Cinpak, Interpreter, salary and expenses	1,893 25
Rev. N. C. Jutras, Lectures	271 50
Supplies	11 80
Total	$ 5,377 50

Expended for instruction work in outlying districts, particularly amongst the foreign-born population.

16.—Vegetable and Horticultural Demonstrations.

Grant, 1914-15	$ 2,000 00	
Balance forward, April 1, 1914	200 00	
Expended to March 31, 1915	.....	$ 318 76
Balance unexpended March 31, 1915	.....	1,881 24
Total	$ 2,200 00	$ 2,200 00

Grants	$ 150 00
School prizes	50 00
Lectures	12 05
Incidentals	106 71
Total	$ 318 76

The growing of vegetables is stimulated by lectures, grants and prizes.

17.—Bulletins.

Grant, 1914-15	$ 3,000 00	
Balance forward, April 1, 1914	.....	$ 119 75
Expended to March 31, 1915	.....	2,856 50
Balance unexpended March 31, 1915	.....	23 75
Total	$ 3,000 00	$ 3,000 00

The whole of this expenditure was for printing, etc.

18.—Farm Mechanics.

Grant, 1914-15	$ 3,000 00	
Expended to March 31, 1915	.....	$ 500 00
Balance unexpended March 31, 1915	.....	2,500 00
Total	$ 3,000 00	$ 3,000 00

Grants to schools	$ 500 00

19—*Miscellanous.*

Grant, 1914-15	$ 75 45	
Balance forward, April 1, 1914	1,938 90	
Expended to March 31, 1915	.....	$ 1,474 98
Balance unexpended March 31, 1915	.....	539 37
Total	$ 2,014 35	$ 2,014 35

Grant, Spring stallion show	$ 200 00
Railway fares, children's club	340 50
Entomological specimens	330 40
Creamery convention fares	91 05
Jas. P. Grant, salary	375 00
M. A. C. disbursements	111 23
Miscellaneous	26 80
Total	$ 1,474 98

Mr. Jas. P. Grant was employed in keeping the financial records of the expenditures under The Agricultural Instruction Act.

SESSIONAL PAPER No. 15c

SUMMARY FINANCIAL STATEMENT TO MARCH 31, 1914.

FEDERAL SUBSIDY OF 1913-14.

Section No.	Classification.	Grant.	Expended to Mar. 31, 1914.	Unexpended Balances Mar. 31, 1914.	Over-expended Balances.
		$ cts.	$ cts.	$ cts.	$ cts.
1	Bee-keeping	1,000 00	218 00	782 00	
2	Demonstration Trains	5,000 00	5,358 57		358 57
3	Demonstration Farms	13,500 00	4,506 58	8,993 42	
4	Field and Animal Husbandry	5,000 00	1,923 54	3,076 46	
5	Poultry Husbandry	2,000 00	869 25	1,130 75	
6	Weed Demonstrations	500 00		500 00	
7	Produce Marketing	3,000 00		3,000 00	
8	Alfalfa Plots	2,000 00	974 11	1,025 89	
9	Children's Clubs	2,000 00	1,027 97	972 03	
10	Agricultural Instructors	3,000 00	1,275 00	1,725 00	
11	Drainage	1,800 00	871 31	928 69	
12	Home Economics—Instruction	2,500 00	748 15	1,751 85	
13	Home Economics—Equipment	2,000 00	1,760 04	239 96	
14	Dairying—Travelling Instructors	3,000 00	2,395 52	604 48	
15	Excursions to College Farms	100 00	100 00		
16	Vegetable Growing and Horticulture	200 00		200 00	
17	Bulletins	2,900 00	3,019 75		119 75
18	Miscellaneous	2,230 05	291 15	1,938 90	
	Totals	51,730 05	25,338 94	26,869 43	478 32

DETAILS OF EXPENDITURE TO MARCH 31, 1914.

1.—Bee-keeping.

Grant, 1913-14	$ 1,000 00	
Expended to March 31, 1914	.....	$ 218 00
Balance unexpended March 31, 1914	.....	782 00
Total	$ 1,000 00	$ 1,000 00
Total	$ 1,000 00	$ 1,000 00
W. Lloyd, salary		$ 208 25
Supplies		9 75
Total		$ 218 00

2.—Demonstration Train.

Grant, 1913-14	$ 5,000 00	
Expended to March 31, 1914	.....	$ 5,358 57
Balance over-expended March 31, 1914	358 57	
Total	$ 5,358 57	$ 5,358 57
Services and expenses, sundry persons	$687 26	
Mrs. R. McCharles, Lecturer	137 75	
		$ 825 01
Equipment and supplies		627 04
Printing and advertising		649 75
Meals and berths		739 00
Incidentals		139 09
C. P. Railway		1,408 15
Boyd Bishop Co.		808 53
F. L. Kenny		162 00
Total		$ 5,358 57

3.—Demonstration Farms.

Grant, 1913-14	$ 13,500 00	
Expended to March 31, 1914	.....	$ 4,506 58
Balance unexpended March 31, 1914	.....	8,993 42
Total	$ 13,500 00	$ 13,500 00
Geo. H. Jones, Superintendent, salary	$ 460 10	
" " expenses	499 23	
S. A. Bedford, expenses	132 45	
		$ 1,091 78
Labour and board		2,624 06
Materials and supplies, fencing, etc		646 08
Lantern		76 00
Incidentals		68 66
Total		$ 4,506 58

4.—Field and Animal Husbandry Lectures.

Grant, 1913-14	$ 5,000 00	
Expended to March 31, 1914	.....	$ 1,923 54
Balance unexpended March 31, 1914	.....	3,076 46
Total	$ 5,000 00	$ 5,000 00
Sundry persons, services and expenses, lectures		$ 1,518 56
Printing, advertising, postage		371 55
Incidentals		33 43
Totals		$ 1,923 54

5.—Poultry Husbandry Lectures and Demonstrations.

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1914	.....	$ 869 25
Balance unexpended March 31, 1914	.....	1,130 75
Total	$ 2,000 00	$ 2,000 00
Premiums		$ 817 05
Expenses, lectures		52 20
Total		$ 869 25

8.—Alfalfa Plots.

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1914	.....	$ 974 11
Balance unexpended March 31, 1914	.....	1,025 89
Total	$ 2,000 00	$ 2,000 00
G. H. Jones, salary	$ 100 00	
" expenses	317 40	
		$ 417 40
Travelling expenses		134 30
Material, implements and supplies		178 54
Seed		53 34
Rent of plots, etc		89 40
Miscellaneous		101 13
Total		$ 974 11

9.—Children's Clubs.

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1914	.....	$ 1,027 97
Balance unexpended March 31, 1914	.....	972 03
Total	$ 2,000 00	$ 2,000 00
Geo. H. Jones, travelling	$ 99 81	
A. Blackstock	42 80	
M. C. Herner	67 10	
		$ 209 71
Prizes		343 05
Seeds and eggs supplied members		353 83
Miscellaneous		121 38
Total		$ 1,027 97

10.—Instructors in Agriculture.

Grant, 1913-14	$ 3,000 00	
Expended to March 31, 1914	.....	$ 1,275 00
Balance unexpended March 31, 1914	.....	1,725 00
Total	$ 3,000 00	$ 3,000 00
A. Blackstock, salary	$ 875 00	
Geo. H. Jones, salary	400 00	
		$ 1,275 00
Total		$ 1,275 00

11.—Tile Drainage.

Grant, 1913-14	$ 1,800 00	
Expended to March 31, 1914	.....	$ 871 31
Balance unexpended March 31, 1914	.....	928 69
Total	$ 1,800 00	$ 1,800 00
W. G. Weiner, salary		$ 205 00
Travelling		39 95
Materials and supplies		490 00
Miscellaneous		18 16
Labour and wages		118 20
Total		$ 871 31

12.—Home Economics.

Grant, 1913-14	$ 2,500 00	
Expended to March 31, 1914	.....	$ 748 15
Balance unexpended March 31, 1914	.....	1,751 85
Total	$ 2,500 00	$ 2,500 00
Jessie D. Ross, services and expenses		$ 352 85
Mrs. E. C. Salisbury, travelling		75 80
Miss M. Kennedy, travelling		27 05
Miss H. M. Gowsell, salary and expenses		274 95
Miss A. F. Playfair, services		17 50
Total		$ 748 15

13.—Equipment, Home Economics.

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1914	.....	$ 1,760 04
Balance unexpended March 31, 1914	.....	239 96
Total	$ 2,000 00	$ 2,000 00
Two thousand handbooks	$ 283 50	
Printing bulletin	1,426 58	
		$ 1,710 08
Office supplies		49 96
Total		$ 1,760 24

14.—Instructors in Dairying.

Grant, 1913-14	$ 3,000 00	
Expended to March 31, 1914	.....	$ 2,395 52
Balance unexpended March 31, 1914	.....	604 48
Total	$ 3,000 00	$ 3,000 00
W. J. Crowe, salary	$ 1,400 00	
" expenses	478 92	
		$ 1,878 92
E. Cinpak, salary and expenses		442 95
Lecturers, services and expenses		68 65
Advertising		5 00
Total		$ 2,395 52

15.—Excursions to Experimental Farms.

Grant, 1913-14	$ 100 00	
Expended to March 31, 1914	.....	$ 100 00
Total	$ 100 00	$ 100 00
Convention train to college		$ 100 00

17.—Publication of Bulletins.

Grant, 1913-14	$ 2,900 00	
Expended to March 31, 1914	.....	$ 3,019 75
Balance overexpended March 31, 1914	119 75	
Total	$ 3,019 75	$ 3,019 75
Bulletins: Dairy, home economics, farm buildings, hog, horse, farm garden		$ 3,019 75

18.—Miscellaneous.

Grant, 1913-14	$ 2,230 05	
Expended to March 31, 1914	.....	$ 291 15
Balance unexpended March 31, 1914	.....	1,938 90
Total	$ 2,230 05	$ 2,230 05
Camera, etc.		$ 192 70
Fares, creamery convention		98 45
Total		$ 291 15

SESSIONAL PAPER No. 15c

AGRICULTURAL AID ACT, 1912.

SUBSIDY $31,730.05.

Expenditure to May 31, 1915—	
Demonstration farms	$ 5,425 30
" trains	3,278 45
Agricultural meetings, lectures	1,046 10
Ploughing matches	230 98
Poultry industry	985 20
Grant to Agricultural societies	14,501 65
Total	$ 25,468 28
Balance unexpended	6,261 77
Interest accrued	139 56
Total	$ 31,869 61

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913, 1914, AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912, to Nov. 30.	1913, to Nov. 30.	1914, to Nov. 30.	1915, to No. 30 (estimated).
	$ cts.	$ cts.	$ cts.	$ cts.
Department—Salaries	10,121 67	14,729 97	14,700 00	14,700 00
" Office expenses	1,287 51	1,675 28	1,496 07	1,500 00
Agricultural Societies and Farmers' Institutes, Judging, Seed Fairs, etc	51,739 73	41,937 40	39,426 53	54,300 00
Agricultural Statistics	2,507 52	3,412 77	2,702 70	3,000 00
Noxious Weeds Inspection	4,078 55	4,896 29	5,612 90	7,000 00
Grants to Live Stock Associations, Winter Fairs, Exhibitions, and Societies (Dom. Fair, $20,000, special in 1913)	24,730 37	36,473 00	19,229 00	11,050 00
Miscellaneous				1,000 00
Manitoba Agricultural College—				
Salaries	50,807 85	68,393 02	76,190 00	86,000 00
Maintenance	26,107 84	36,461 85	52,172 71	66,500 00
Fuel	8,956 25	12,537 55	40,342 06	35,000 00
Totals	180,337 29	220,517 13	251,872 08	280,050 00
Revenue—				
Agricultural College fees, etc	15,668 09	16,509 91	18,175 77	20,000 00
Net total	$164,669 20	$204,007 22	$233,696 31	$260,050 00

SASKATCHEWAN

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

To provide for the introduction of agricultural and domestic science courses into High schools and Collegiate Institutes and the training of teachers in agriculture at the Provincial Normal schools; (to be expended by the Department of Education in the form of grants to such institutions under regulations to be framed and approved)	$ 6,500 00
College of Agriculture. To provide additional teachers and to conduct additional research work	14,000 00
Salaries and expenses of travelling instructors and demonstrators in field husbandry, animal husbandry and dairying; (5 in field husbandry, under Weeds Branch, $10,000; 3 in animal husbandry, under Live Stock Branch, $7,000; 3 in dairying, under Dairy Branch, $6,652.31	23,652 31
Educational and development work to promote and direct organization of farmers along co-operative lines for production and marketing of farm products	6,000 00
To meet Province's share of cost of equipment, manning and advertising demonstration trains	10,000 00
To assist Saskatchewan Veterinary Association to hold post-graduate short courses for Veterinary Surgeons	1,000 00
Total	$ 61,152 31

OUTLINE OF WORK PERFORMED.

The annual Federal grant to Saskatchewan for agricultural instruction is expended through three channels, the College of Agriculture, the Department of Agriculture, and the Department of Education. The understanding is that in a few years the grant shall be equally divided among these three.

The College of Agriculture is an integral part of the University of Saskatchewan, located at Saskatoon. Its work falls into three divisions, viz., research work, teaching work carried on at the institutions, and extension work carried on mainly through the medium of agricultural societies and some of the grain growers' associations.

The Department of Education assumes responsibility for the teaching of agriculture in the elementary and secondary schools, and the training of teachers in connection with this work.

While the activities of the Department of Agriculture, are chiefly of an administrative character, it is found in practice that they cannot be entirely severed from instructional work. Hence, the co-operatively-owned but Government-operated creameries require that instruction be given to the patrons in correct dairying methods; the movement for the licensing of stallions makes instruction necessary as to what constitutes soundness and correct conformation in a horse; the policy of selling beef and dairy cattle and sheep to farmers on part credit carries with it the necessity for giving instruction in their proper care and management to those who purchase them. The campaign against noxious weeds cannot be successful without a recognition of the fact that weeds are a by-product of poor farming. To encourage co-operative activities, carries with it the necessity for instruction in the principles underlying successful co-operation. It is at this point that the subsidy granted under the Agricultural Instruction Act is drawn upon—to assist the department to provide the instruction it feels called upon to give in order properly to supplement its administrative work.

SESSIONAL PAPER No. 15c

COLLEGE OF AGRICULTURE.

The College of Agriculture of the University of Saskatchewan reaches the people on the farm directly through its Extension Department. The money obtained by the University from the fund authorized under the Act has been expended in most part in salaries of additional members of the staff—men and women—called for by the extension work, and by the strengthening of the agricultural teaching and research departments, and the department of Women's Work. In 1914, $16,400 was used for this purpose.

Six appointments have been made in addition to the thirteen stated on page 111 of the previous Report, as follows:—Two assistants in Field Husbandry; three research assistants in Soil Physics and Chemistry, and a lecturer in Homemakers' Work.

Extension Work.—The extension work, supported by the funds received from the Federal subsidy, consisted mainly in the holding of short courses, the attendance at which in 1914-15 to March 31, was over 3,000 persons.

Short Courses.—The following is a complete statement of the short courses held during the year beginning March 31, 1914, and ending March 31, 1915.

1. At the University—Courses of four days or less:

(*a*) Homemakers' Convention, held last week in May, 1914. One hundred and twenty-four in attendance. Topics relating to the home, school and neighbourhood were studied and demonstrations in cooking were given.

(*b*) Agricultural Societies' Convention, January, 1915, 139 delegates in attendance. Besides discussions on agricultural society work proper, lectures were given on tillage methods, seed selection, live stock selection and breeding, feeding and management; and demonstrations on the selection and judging of cattle, sheep, horses, swine and poultry.

(*c*) Dairymen's Convention delegates, January, 1915. Ninety-five in attendance. Demonstrations on the selection and judging of dairy cattle; lectures on methods of improving dairy herds and lectures on staple forage crops for dairy cattle in Saskatchewan, and how to produce the same.

Courses of More Than Four Days:

(*a*) Domestic Science for young women from the farms. Three weeks in June, 1914. Twenty-one in attendance.

(*b*) Engineering for young men wishing to learn to operate internal combustion engines. Three weeks in June, 1914; seven in attendance.

(*c*) Farmers' Course. Five days in January, 1915. One hundred and fifty-two in attendance. The topics discussed were tillage, seed, best methods for preparing and managing summer-fallow, preparation of stubble land for crops, preparation of prairie land for crops, demonstration on the selecting, judging, breeding and marketing of farm animals, horses, cattle, sheep, swine and poultry; lectures and demonstrations on farm machinery.

2. At Outside Schools and Colleges:

(*a*) Regina College, for young men from the farms taking the winter course there. The College of Agriculture sent four professors to lecture and demonstrate on tillage, crops, implements and live stock, including poultry. Fifty students and forty-seven farmers were registered for this course.

(*b*) Regina Normal School, for the teachers a similar course of lectures was put on for five days. One hundred and thirty-four in attendance.

(*c*) Moosejaw College, for young men from the farms taking the winter short course there—85 students and 12 farmers registered; a course was given similar to that given at the Regina College.

(*d*) Saskatoon Normal School, a similar course was given. One hundred and ninety-eight were registered.

3. Courses of two to four days at seventeen other points: The total attendance was 1,807 men and 994 women.

These courses were for men and women, and where possible, the school children of the higher grades. Lectures and demonstrations by means of charts and lantern slides on tillage, crops and animals. At nearly every point much interest was manifested. The subjects discussed at these meetings were those that were asked for by the people themselves.

Other agencies of extension work are the agricultural societies, better-farming specials, dairy cars and homemakers' clubs. Extension work was carried on also in newer districts where no agricultural societies had been organized. A representative of the College went through the districts, met homesteaders, interested them in the work, and made arrangements for meetings. Then followed the lecturers, who usually got a good hearing, and something valuable was done. The work was done mainly in June and July, and is performed largely by members of the staff of the College. Over 125,000 people were reached directly by these agencies, not including those who attended the short courses.

In the research work being carried on the members of the staff whose appointment is due to the subsidy are rendering valuable assistance. This work includes investigation and experiment in connection with tillage, soils, alfalfa, cereals, animal and poultry husbandry, biology, agricultural engineering, machinery and building problems. Data is being gathered concerning the cost of farming operations and farm machinery.

Women's Work: In the department of Women's Work of the University is included the direction and assistance of 140 homemakers' clubs, in addition to the holding of short courses for women. The principal activities of the clubs are in connection with the following: Patriotic work, relief to sufferers from poor crops, improvement of school surroundings, care of needy children, holding of short courses, opening community club library and reading rooms. Speakers and demonstrators are sent out when asked for by the clubs. Sixty libraries have been started, and in several places, district nurses have been provided through the activities of the clubs.

The following is an extract from the report of President Murray on the work of the University of Saskatchewan in 1914-15:—

> "We are all greatly gratified to find that the university is appealing to students of the different nationalities in the province, and that these students are attaining such high distinction. Most cordially are they welcomed to the university. The life of this province is being greatly enriched by the artistic, literary and musical gifts which they and their peoples are bringing to us.
>
> We of Canadian birth do not realize to the full how much Saskatchewan owes to European culture. Every convention, be it grain growers', homemakers', or municipalities', but deepens the conviction that their high character is due to the training and culture of Britain and the continent of Europe. Unless we exert ourselves to the uttermost, the next generation will fall behind the present in intellectual and artistic attainment.
>
> It is now a fitting time, after three years' trial, to pass judgment upon the experiment of bringing together students in arts, agriculture and the other professional schools on the same campus and under the same roof. Very many questioned the wisdom of our action, and some predicted discord, the neglect of agriculture and an accentuation of the movement from the farms to the towns.

The students in the various colleges have never been conscious of sectional distinctions. They have roomed together, studied together, participated side by side in the same sports and co-operated in the different student societies. The experiment of co-operation has been an unqualified success among the students, and we believe that it will have far-reaching success in the life of our province. Instead of students in agriculture being drawn into arts, we have found that the movement has been towards agriculture.

While much of the credit of this is due to the students, a very large share is also due to the spirit of the staff."

DEPARTMENT OF EDUCATION.

It is the policy of the Department of Education to make agricultural instruction an integral part of the educational system. The design at present is to extend such instruction to the public schools, the high schools and collegiate institutes. The courses to be established will look forward to practical work on the farms and to higher courses in the College of Agriculture. It is the purpose to encourage the practice of school gardening (voluntary for the present) making efficiency for rural life the basic principle underlying the work, interpreted as including its material and social aspects. The work will be so devised as to attempt to demonstrate that life on the farm can be made both profitable and pleasant.

Hitherto the department has been engaged with the urgent problem of organizing school districts to keep pace with the extending population to the exclusion to some extent of the newer movements in education. It is recognized that the most important of these newer movements is efficient agricultural instruction.

An Agricultural Instruction Committee has been appointed to advise on all matters pertaining to the scope and character of agricultural education in public, high and normal schools. Two Directors of School Agriculture have been appointed. F. W. Bates, M. Sc., will have charge of this work in the northern half of the province, with headquarters at Saskatoon; while A. W. Cocks, B. Sc., will be responsible for the supervision of the work in the southern half of the province, and will have his headquarters at the Department of Education, Regina. Miss Fannie A. Twiss was appointed in the spring of 1915 Director of Household Science for the province.

Short courses in agriculture and household science were conducted in July, 1915, at the University of Saskatchewan and at the Provincial Normal School, Regina. These courses were well attended by the teachers and inspectors of the province.

In view of the importance of Forestry to the province, a bulletin entitled "Tree Planting for the Schools of Saskatchewan," has been published and distributed. Another bulletin entitled, "Gardening for the Schools of Saskatchewan," has been distributed and is proving very helpful to those teachers undertaking instructions in horticulture and agriculture.

DEPARTMENT OF AGRICULTURE.

1. *Animal Husbandry.*—Travelling instructors and demonstrators were employed as follows: Three travelling instructors in live stock or animal husbandry are at work under the direction of the Provincial Live Stock Commissioner. Their salaries and expenses are provided by the Federal grant. These men assist in the work of live stock distribution, and promote the horse breeding industry by assisting in the administration of the Horse Breeders' Act.

2. *Dairying.*—Under the direction of the Provincial Dairy Commissioner, three dairy instructors are working in the province. That creameries may be located only in places where they will prove successful, one of the instructors devotes the greater

portion of his time to investigating. Should he decide that the erection of a creamery is advisable, he assists the local dairymen to organize and get their plant into operation. In 1915, he was further delegated with the duty of getting information and statistics concerning cream buying stations within the province preliminary to adopting legislation effecting their control. Two instructors are employed to relieve the managers of the local creameries, allowing them to travel through the territory tributary to their creameries, visiting their patrons, seeing how the cream is produced and handled and giving advice to the producers. During the winter months special dairy demonstration and lecture cars are run on the different railway lines. The principal speakers on these are the provincial dairy instructors, assisted by members of the college staff. The addresses covered general dairy topics with particular reference to the improvement and management of a dairy herd. Lantern views were used in connection with the addresses. The total attendance was 6,544.

3. *Field Husbandry.*—Five instructors in field husbandry, known as field representatives, have been appointed under the Weed and Seed Branch. Their salaries and travelling expenses are charged to the federal grant, and their duties include the supervision of the Agricultural Secretaries and the Weed Inspectors, who were appointed and paid by the municipalities. To this end, the province has been divided into five districts with a representative in charge of each. Three of the representatives are graduates and the other two are undergraduates of the Manitoba Agricultural College. The agricultural secretaries devote all their time to the promotion of better farming, holding public meetings and visiting the individual farmers. They also act as inspectors under the Noxious Weeds Act, and it is the policy of the department to encourage the appointment of successful and progressive farmers as agricultural secretaries to promote better farming, instead of merely appointing inspectors to enforce weed destruction. The field representatives direct the work of these men, advise them in regard to matters connected with field husbandry, and address meetings. The plan is not to be regarded as a permanent solution of this phase of the problem of agricultural instruction. It will probably serve merely to tide over in some measure until such time as a steady supply of trained and suitable men and machinery are available, whereby some larger unit than a rural municipality can co-operate with the department in maintaining a competent, qualified district representative throughout the year.

Better Farming Special.—The college co-operated with the department in manning and equipping the demonstration train which operated in June and July, 1914, over the Canadian Pacific railway. The equipment carried consisted of models of farm buildings, machinery and implements, two cars of stock and poultry. A car was provided for the teaching of field husbandry and another for demonstration work. Accompanying the train were the assistant professors of agricultural engineering, poultry husbandry, animal husbandry and field husbandry, and the heads of the various branches of the Department of Agriculture. During the five weeks' trip, 1,287 miles of railway were traversed, stops made at 88 towns and villages, and a total of 35,000 attended the lectures.

Co-operative Organizations: The educational and development work to promote co-operative production and marketing of farm products is in the hands of a director and an assistant, whose salaries and expenses are charged to the subsidy. Their principal work is to gather and disseminate information regarding agricultural co-operative producing and marketing associations, and to encourage and assist in the organization of such associations by supplying information regarding markets, freight rates, etc.; by aiding in drawing up articles of incorporation, by-laws, etc., and by supplying speakers to give advice upon the particular line of work which the association has in view. At the close of 1914, 113 associations had organized and registered under the

Agricultural Co-operative Association Act, covering all parts of the province. Seventy of these were engaged in the purchase of supplies, three in the marketing of live stock, six engaged in that along with other lines of business, and the remaining 29 had not at that time begun active business operations. During the season of 1914, valuable assistance was rendered Saskatchewan wool-producers through a co-operative wool marketing project organized and carried out by the department. It was found that wool production was not bringing the farmers the returns that it should, due to lack of care in preparation, and selling and shipping in small quantities. To overcome these defects and to stimulate the sheep-raising industry, the department undertook in the spring of 1914 to market, without charge, the clip for sheep men who would prepare their wool in accordance with directions. Some 180 sheep-owners took advantage of this offer, a total of 69,404 pounds of wool was assembled in a warehouse in Regina, and sold in car lots to a firm of American wool dealers, an average price of 16·47 cents being paid to the producers after defraying all costs for freight to Regina, cost of sacks, twine, and other incidental expenses. Considering that prices received in former years ranged from 10 cents to 13 cents per pound, the results were most satisfactory. So successful were these operations that the department repeated and enlarged the work in 1915. In addition to operating a receiving and grading warehouse in Regina, arrangements were made to accept delivery of carload lots of wool at any local shipping point in the province. This arrangement should add materially to the value of the undertaking as there are many points where three or four breeders could combine to make up a car lot, thereby increasing prices by reducing freight charges.

The following bulletins and pamphlets were issued:—

	Copies
Live stock marketing (pamphlet)	5,000
Co-operative beef rings (pamphlet)	1,500
Live stock marketing (bulletin)	15,000
Suggested lines of co-operative production	15,000

Also a large number of copies of the Co-operative Associations Act with explanations.

Short Courses for Veterinary Surgeons.—The Saskatchewan Veterinary Association conducted its first Summer School at Regina from July 27 to August 1, 1914. A number of prominent veterinarians lectured and held clinics. A grant of $500 for expenses was made out of the federal fund. The Summer School was held in connection with the semi-annual meeting of the association of which Dr. J. A. Armstrong, of Regina, was president. The other members of the council were Doctors J. J. Murison, Arcola; D. S. Tamblyn, Regina; John King, Carlyle; Norman Wright, Saskatoon; R. A. McLoughry, Moosomin; and A. G. Hopkins. In addition to the instruction by Saskatchewan veterinarians, lectures and practical instruction were given by Dr. C. D. McGilvray, of Winnipeg, Dr. John Scott, of Peoria, Illinois, and Dr. A. Knight, Chief Veterinary of British Columbia. A printed report was issued giving a digest of the instruction at this Summer School.

FEDERAL SUBSIDY OF 1914-1915.

SUMMARY STATEMENT TO MARCH 31, 1915.

Section No.	Classification.	Grant, 1914-15.	Expended to Mar. 31, 1915.	Balance Unexpended, Mar. 31, 1915.
		$ cts.	$ cts.	$ cts.
1	School Courses in Agriculture and Domestic Science	6,500 00	682 24	5,817 76
2	College of Agriculture	14,000 00	26,431 95	15,300 98
3	Demonstrations in Animal Husbandry	7,000 00	3,521 54	3,478 46
4	Demonstrations in Dairying	6,652 31	4,810 26	1,842 05
5	Demonstrations in Field Husbandry and Weed Control	10,000 00	8,481 32	1,518 68
6	Co-operation in Production and Marketing	6,000 00	3,771 26	2,228 74
7	Demonstration Trains	10,000 00	5,016 32	4,983 68
8	Veterinary Short Courses	1,000 00	500 00	500 00
	Total Grant	61,152 31		
	Balance Sec. 2, brought forward April 1, 1914	27,732 93		
		$88,885 24	$53,214 89	$35,670 35

In Saskatchewan, no record of expenditure of the federal subsidy of 1913-14, amounting to $54,296.29, was kept separate from the expenditure of the provincial appropriations for agriculture, and therefore no detailed statement for that year can be given.

DETAILS OF EXPENDITURE OF GRANT OF 1914-15 TO MARCH 31, 1915.

1. School Courses in Agriculture and Domestic Science.

Grant, 1914-15	$ 6,500 00	
Expended to March 31, 1915	.....	$ 682 24
Balance unexpended March 31, 1915	.....	5,817 76
Total	$ 6,500 00	$ 6,500 00

Miss Twiss, Director of Household Science, salary (3 months), $399.99, expenses, $94.40	$ 494 39
Printing and distribution of bulletin "Tree Planting"	172 00
Incidentals	15 85
Total	$ 682 24

2. College of Agriculture.

Grant, 1914-15	$ 14,000 00	
Balance forward, April 1, 1914	27,732 93	
Expended to March 31, 1915	.....	$ 26,431 95
Balance unexpended March 31, 1915	.....	15,300 98
Total	$ 41,732 93	$ 41,732 93

Salaries of Instructors (additional):—

J. M. Smith, Assistant Professor Agricultural Engineering	$ 1,950 00
R. K. Baker, Assistant Professor Poultry	1,950 00
A. E. Hennings, Assistant Professor Physics	1,950 00
A. M. Shaw, Assistant Professor Animal Husbandry	2,175 00
G. H. Cutler, Second Professor Field Husbandry	2,575 00
S. L. Basterfield, Research Assistant Chemistry	1,125 00
T. Thorwaldsen, Assistant Professor Chemistry	1,350 00

2. College of Agriculture.—Continued.

W. J. H. Tisdale, Assistant Professor Animal Husbandry	$ 1,350 00	
K. G. MacKay, Assistant Professor Dairying	1,000 00	
J. Cameron, Research Assistant Field Husbandry	265 00	
M. Henne and H. Saville, Assistants Field Husbandry	916 21	
G. Fountain and S. Wright, Assistants Field Husbandry	541 52	
Soil Analysis Assistants	1,300 00	
		$ 18,447 73
Soil analysis apparatus		1,750 18
Women's work, salaries and expenses—		
Miss DeLury, Director, salary	$ 1,600 00	
Miss Harrison, Lecturer and field work	1,000 00	
Mrs. Thomas, Assistant at Short Courses, expenses and fee	224 00	
Mrs. Howell Smith, Assistant at Short Courses, expenses and fee	77 20	
Mrs. Archibald, Assistant at Short Courses, expenses and fee	50 00	
Mrs. Storer, Assistant at Short Courses, expenses and fee	23 00	
Bulletins	275 00	
Travelling expenses	382 13	
		3,631 33
Home economics		338 45
Winter short courses and extension work in rural districts		2,264 26
Total		$ 26,431 95

Professor Cutler is engaged in the work of cereal improvement; Messrs. Cutler, Smith, Baker, and Shaw all assist at the short courses and on the Farming Special, and attend meetings; Prof. Shaw judged and lectured at ploughing matches; Prof. Baker had charge of the poultry demonstration car; Prof. Shaw took charge of the College exhibit at Regina. Prof. Tisdale is chiefly employed in addressing extension meetings. He takes the animal husbandry work at the outside short courses, and acts as judge at fairs. Prof. MacKay instructs at dairy courses, short courses and on Live Stock train; Prof. Hennings is engaged in teaching and in soil analysis work; Prof. Thorwaldsen teaches of chemistry and conducts work on soil analysis; Messrs. Saville, Henne, Wright and Fountain assist in the field husbandry work; other assistants are engaged in analytical work. Miss DeLury directs the women's work from the University. Miss Harrison is engaged most of the time travelling among the Women's Clubs, where she lectures and assist the progress of the movement.

3.—Live Stock Demonstrations.

Grant, 1914-15	$ 7,000 00	
Expended to March 31, 1915	.....	$ 3,521 54
Balance unexpended March 31, 1915	.....	3,478 46
Total	$ 7,000 00	$ 7,000 00

Travelling Instructors—	
E. W. Brett, salary $406.67, expenses $563.96	$ 970 63
F. H. C. Green, salary $100, expenses $114.20	214 20
J. W. Hunter, salary $800, expenses $793.60	1,593 60
J. S. Fulton, salary $294.19, expenses $448.92	743 11
Total	$ 3,521 54

4.—*Demonstrations in Dairying.*

Grant, 1914-15	$ 6,652 31	
Expended to March 31 1915	.....	$ 4,810 26
Balance unexpended March 31, 1915	.....	1,842 05
Total	$ 6,652 31	$ 6,652 31
Instructors—		
W. A. McCorkell, salary $932.28, expenses $396.81		$ 1,329 09
J. A. MacDonald, salary $1,250, expenses $503.62		1,753 62
Jas. Graham, salary $549.03, expenses $400.25		949 28
Operating dairy cars, expenses		641 42
Dairymen's Convention, expenses		126 85
Total		$ 4,810 26

5.—*Demonstrations in Weed Control.*

Grant, 1914-15	$ 10,000 00	
Expended to March 31, 1915	.....	$ 8,481 32
Balance unexpended March 31, 1915	.....	1,518 68
Total	$ 10,000 00	$ 10,000 00
Field Representatives—		
A. J. McPhail, salary $536.67, expenses $363.29		$ 899 96
J. G. Rayner, salary $1,083.33, expenses $1,087.72		2,171 05
E. H. Hawthorne, salary $1,070, expenses $902.65		1,972 65
T. L. Guild, salary $543.33, expenses $450.48		993 81
W. Betts, salary $621.30, expenses $544.55		1,165 85
Motor car		726 85
Weed Inspectors and Agricultural Secretaries, expenses of Convention		551 15
Total		$ 8,481 32

6.—*Co-operation in Production and Marketing.*

Grant, 1914-15	$ 6,000 00	
Expended to March 31, 1915	.....	$ 3,771 26
Balance unexpended March 31, 1915	.....	2,228 74
Total	$ 6,000 00	$ 6,000 00
W. W. Thomson, Director, salary		$ 1,500 00
" " expenses		451 25
W. G. Mawhinney, Assistant, salary		432 79
" " expenses		161 62
Government Printer, bulletins, etc		1,180 95
Incidentals		44 00
Total		$ 3,771 26

7.—*Demonstration Trains.*

Grant, 1914-15	$ 10,000 00	
Expended to March 31, 1915	.....	$ 5,016 32
Balance unexpended March 31, 1915	.....	4,983 68
Total	$ 10,000 00	$ 10,000 00
Salaries		$ 1,234 50
Sustenance and travelling expenses		3,005 70
Printing		2,151 05
Equipment		489 59
Feed for life stock and incidentals		135 48
		$ 7,016 32
Refunded from Provincial Treasury		2,000 00
Total		$ 5,016 32

8.—Veterinary Short Courses.

Grant, 1914-15	$ 1,000 00	
Expended to March 31, 1915	.....	$ 500 00
Balance unexpended March 31, 1915	.....	500 00
Total	$ 1,000 00	$ 1,000 00
Saskatchewan Veterinary Association grant		$ 500 00

AGRICULTURAL AID GRANT, 1912.

SUMMARY STATEMENT.

Section No.	Classification.	Grant.	Expended.
		$ cts.	$ cts.
1	College of Agriculture	15,000 00	15,000 00
2	Weed Control	3,000 00	3,000 00
3	Dairying	4,000 00	4,000 00
4	Poultry	500 00	500 00
5	Live Stock	4,296 29	4,296 29
6	Winter Fair Board	5,000 00	5,000 00
7	Horse Breeders' Association	500 00	500 00
8	Cattle " "	1,000 00	1,000 00
9	Sheep " "	500 00	500 00
10	Swine " "	500 00	500 00
		$34,296 29	$34,296 29

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913, 1914, AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912–13. To Feb. 28.	1913–14, To April 30 (14 mos.)	1914–15, To April 30.	1915–16, To April 30 (estimated).
	$ cts.	$ cts.	$ cts.	$ cts.
Department—Salaries and General expenses	28,620 37	41,186 38	39,536 09	40,155 00
General Agricultural interests—				
Agricultural Societies; Provincial Organization; Grants; Contingencies	47,684 15	56,148 90	67,739 52	73,600 00
Live Stock Industry	28,603 84	68,575 84	23,593 85	25,600 00
Dairy and Poultry Industries	266,124 63	471,272 25	84,600 63	88,000 00
Agricultural Statistics and Publicity	27,328 20	33,413 43	36,404 16	29,300 00
Bacteriological Laboratory	6,571 11	8,111 11	8,443 74	8,400 00
Weed Control and Game Protection	14,228 46	18,398 52	19,588 94	22,900 00
Bureau of Labour—				
Farm and domestic labour and factory inspection	27,194 84	55,542 00	8,968 35	8,900 00
Miscellaneous Services—				
Vital statistics; Natural History, Scholarships, Brands, etc., expenses under Agricultural Instruction Act	16,023 95	27,892 19	24,352 72	26,000 00
Totals	462,379 55	780,540 62	337,228 00	322,855 00
Less Revenue	263,216 05	552,340 78	179,291 51	100,500 00
	199,163 50	228,199 84	175,936 49	222,355 00
Education Dept.—				
College for Agricultural Extension	24,000 00	24,000 00	24,000 00	24,000 00
Manual training and Domestic Science organization				1,800 00
Grand Total	$223,163 50	$252,199 84	$181,936 49	$248,155 00

ALBERTA.

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

For operation of Schools of Agriculture	$ 36,000 00
For buildings in connection with Schools of Agriculture	6,000 00
For special instructor in dairying, etc.	4,000 00
For dairy competition	4,000 00
For purchase of books for libraries, Schools of Agriculture	1,000 00
Miscellaneous	310 41
Total	$ 51,310 41

Outline of Work Performed.

SCHOOLS OF AGRICULTURE.

In 1912-13, three Schools of Agriculture were established in connection with the Provinces' Demonstration Farms at Claresholm, Olds and Vermilion. The understanding with the Federal authorities was that the province should provide the main buildings and that the subsidy should be drawn upon to provide their equipment and maintenance. Practically the whole of the grants of 1913-14 and 1914-15 were used in connection with these schools. They were put into operation in the autumn of 1913.

The school at Claresholm was intended to serve that portion of the province south of the Canadian Pacific Railway line through Calgary; the school at Olds was considered as belonging to the central part of the province, while the school at Vermilion was to draw its students from the eastern and northern portions of Alberta. Thus the students had comparatively easy access to institutions of agricultural education. Nor was this the only consideration. It was anticipated that the young people would more readily attend smaller schools, situated under rural conditions and where board and lodgings could be obtained at more reasonable rates than would be the case with a large college in a large town. The school buildings are large and well lighted. Each contained, as originally constructed, two lecture rooms, animal husbandry room, science room, dairy, two household science rooms, besides a large assembly room, offices and library. On account of the large attendance and the demand for improved equipment, two additional buildings have been provided at moderate cost, one for farm mechanics (carpentry and forge work); and one for live stock judging and seed instruction.

The stock for the work in animal husbandry is obtained from the adjoining demonstration farm or from local breeders, and at times some is shipped in for temporary use by the Department of Agriculture. The science rooms are well stocked with all that is necessary for simple demonstration and analyses. The dairy rooms are fitted out with equipment for milk-testing, for separating and for churning. All the leading firms have installed separators for the use of the students. The kitchens in the household science flats are each equipped to handle twenty-four students. The sewing rooms contain tables and sewing machines. There are also rooms furnished as dining rooms. Farm mechanics is taught in a separate building of two stories, having a carpenter shop upstairs and a blacksmith shop below. The former has twenty-four benches and full carpenter tool equipment, also a woodworker for general use. The blacksmith shop is furnished with eighteen forges and vises, with all the necessary tools for general blacksmithing.

SESSIONAL PAPER No. 15c

The work of the schools is divided into two main divisions: (1) Agriculture, and (2) Household Science.

1. *Agriculture.*—The aim of this course is to make practical farmers of the young men who take it. The work embraces animal husbandry, field husbandry and farm mechanics, but due attention is given to farm management, farm book-keeping, agricultural physics, chemistry, bacteriology, mathematics, and English. The regular school staff is assisted by members of the staff of the Deparment of Agriculture and of the University of Alberta. The course in Agriculture is of two years' duration and carries with it an associate diploma. There is no entrance examination and there are no fees. The work aims to furnish the standard demanded for entrance into third year work at an agricultural college.

2. *Household Science.*—The aim of this department is to train young women in the economic management of the home. The course covers a period of two sessions of five months each. The first is devoted to home problems, and is planned in the interest of those who have only one year to spare. The work of the second year is designed, in addition to the home-makers' course, to assist those who are preparing to teach domestic science.

In addition to the regular courses, a short course of six weeks is held in each school during the winter months. This course is devoted wholly to practical work, and is complete in itself.

The schools completed their second teaching year on March 26, 1915. The number of graduates was as follows:—

	Young men.	Young women.
Claresholm	28	8
Olds	22	8
Vermilion	15	8
Total	65	24

Most of the young men who graduated returned to the farm, but a number intend to enter the College of Agriculture at the University in the autumn of 1915.

The enrolment in the different schools over the two seasons was as follows:—

	1913-14.	1914-15.
Claresholm—		
Boys	71	75
Girls	35	33
Olds—		
Boys	61	88
Girls	39	35
Vermilion—		
Boys	34	43
Girls	28	10
Total	268	284

A considerable number of those in the second year came over from the first year. This reduces the number of students in attendance to between four hundred and fifty and five hundred. The attendance is regarded as remarkable, and it may safely be concluded that the schools are fitting aptly to a direct need, or they would not enjoy the patronage they do. Of the boys, about ten per cent came from the immediate vicinity, and the remainder from a distance. Nearly all of the latter came from rural districts. In ages the range was from sixteen years to about thirty years, while in academic standing the range was from a few in the third form to a few who had actually taught school. It is the opinion of the principals that the age limit of fourteen years is too low—the students who made the greatest progress and

gave the most satisfaction, being those who were in the twenties, young men with a purpose, who realized that they had a fine last opportunity and who were anxious to get as much as possible from the course. The students of each school organized into a self-governing body, forming its own constitution, drawing up most of the rules and regulations, conducting its own school functions and imposing all necessary discipline. The plan has been very satisfactory.

The system on which agricultural education in Alberta is based differs somewhat from that in vogue in other Canadian provinces. The schools have succeeded because of their definite and specific aim in relation to country needs, and likewise because their establishment on the Demonstrations Farms has provided the atmosphere necessary to good results. It is the aim of these schools to take the boy where it finds him, and to meet, as the town high schools do not meet, the case of the country boy who wishes to follow country work. It likewise fills the gap between the common school and the university school of agriculture.

These schools are bound to exert an invaluable influence on the rural life of the province. If, in the opinion of the authorities the Agricultural Aid Act, and its successor, the Agricultural Instruction Act, did nothing more for a province than make such schools possible, they may well be said to have accomplished a magnificent purpose.

TEACHING STAFF.

Claresholm School.

William John Stephen, B.A., B.S.A., Principal and Instructor in Field Husbandry.
Peter McDonald Abel, B.S.A., Instructor in Animal Husbandry.
Oliver Stanley Longman, B.S.A., Instructor in Farm Mechanics.
James Crawford Hooper, M.A., Instructor in English and Elementary Science.

Olds School.

William James Elliott, B.S.A., Principal and Instructor in Animal Husbandry.
Instructor in Field Husbandry.
George Richard Holeton, B.Sc., Instructor in Farm Mechanics.
James Fowler, M.A., B.Sc., Instructor in English and Elementary Science.

Vermilion School.

F. S. Grisdale, B.S.A., Principal and Instructor in Field Husbandry.
James Gordon Taggart, B.S.A., Instructor in Animal Husbandry.
Graham Lawson Shanks, B.S.A., Instructor in Farm Mechanics.
Edward Stanley Hopkins, B.S.A., Instructor in English and Elementary Science.

Travelling Instructors.

Miss M. M. Goldie, Instructor in Household Science.
Miss M. Lawson, Assistant Instructor in Household Science.
H. S. Pearson, Provincial Dairy Instructor.
G. W. Scott, Provincial Dairy Instructor.
A. W. Foley, Provincial Superintendent of Poultry.
Dr. Percy Talbot, Provincial Veterinarian.

Special Lecturers.

(1) S. G. Carlyle, Superintendent of Demonstration Farms.
(2) Special Instructor in Dairy Farming.
(3) W. F. Stevens, Live Stock Commissioner.
(4) C. P. Marker, Provincial Dairy Commissioner.
(5) Alex. Galbraith, Special Lecturer on Horses.

Professor Grisdale was appointed principal of the school at Vermilion in the spring of 1915, to take the place of Professor Howes, who had been appointed Dean of the Faculty of Agriculture. Previously Professor Grisdale occupied the position of Instructor in Field Husbandry at Olds. At the same time, Mr. H. A. Craig, Superintendent of Demonstration Farms, was appointed Deputy Minister of Agriculture, his place being filled by Mr. S. G. Carlyle.

During the whole year the various officers at each school act in the adjacent territory in much the same way as the district representatives do in Ontario, holding meetings and advising with farmers. This work is facilitated through each school having a motor car.

The schools are used also for holding provincial agricultural meetings. Thus at Olds the secretaries of Agricultural Societies convened for their annual conference, as did the officers of the Women's Institutes. This was one reason for providing each school with an assembly hall. Patriotic workers have also utilized the schools.

A series of twenty lectures on agricultural subjects under the direction of Hon. Duncan Marshall, Minister of Agriculture for Alberta, was given in the Board of Trade rooms, Calgary, between February 8 and February 20, 1915. The Minister and nine lecturers from the provincial agricultural schools and demonstration farms took part, their subjects including dairy cattle, horses, beef cattle, poultry, sheep enterprises, mutton breeds and their management, grading up a dairy herd, foodstuffs available to the Alberta poultryman, hog production, cutting up and curing of pork, soil cultivation, grain judging, dairy production, and a resume of the work of the Department of Agriculture. The total attendance was 2,400, an average of 120 for each lecture.

LOCATION OF DEMONSTRATION FARMS.

1. *Claresholm School and Farm.*—Claresholm is in the district of Macleod on the Macleod-Calgary branch of the Canadian Pacific railway, 82 miles south of Calgary and 26 miles north of Macleod.

2. *Olds School and Farm.*—Olds is in the district of Red Deer on the Calgary-Edmonton branch of the Canadian Pacific railway, 58 miles north of Calgary and 136 miles south of Edmonton.

3. *Vermilion School and Farm.*—Vermilion is in the district of Victoria on the Canadian Northern railway, 130 miles east of Edmonton.

4. *Medicine Hat Farm.*—Medicine Hat is in the district of Medicine Hat on the main line of the Canadian Pacific railway, and the Crowsnest Pass branch (via Lethbridge and Macleod) 180 miles east of Calgary.

5. *Stony Plain Farm.*—Stony Plain is in the district of Edmonton on the Grand Trunk Pacific and the Canadian Northern, 21 miles west of Edmonton.

6. *Sedgewick Farm.*—Sedgewick is in the district of Strathcona on the Wetaskiwin extension of the Canadian Pacific railway, 90 miles southeast of Edmonton.

7. *Athabaska Landing Farm.*—Athabaska Landing is in the district of Edmonton, on the Edmonton-Athabaska branch of the Canadian Northern, 96 miles north of Edmonton.

COLLEGE OF AGRICULTURE.

By Order in Council of April 29, 1915, the Alberta Government took a definite step towards the establishment of a college of agriculture which will be a part of the University of Alberta, situated at Edmonton. Professor E. A. Howes, B.S.A., principal of the School of Agriculture, at Vermilion, was appointed dean of the faculty of agriculture. Mr. George Harcourt, B.S.A., Deputy Minister of Agriculture, was appointed assistant to the dean.

Dean Howes is a graduate of the Ontario Agricultural College. Prior to his college training, he was a leader in consolidated school work in Ontario, and for a number of years was principal of the Macdonald Consolidated School, at Guelph. Upon leaving the Ontario Agricultural College he became associated with the Seed Branch at Ottawa.

He afterwards accepted the principalship of the Vermilion School of Agriculture, in Alberta, at its inception two years ago.

In the agricultural department of the University only advanced work will be taught, beginning with the third year. The Board of Agricultural Education will fix the course of study in both schools of agriculture and the university, but it has been settled that to become eligible for entry to the latter, students must have taken the two-year course in one of the schools of agriculture. For the opening of the university there are in readiness sixty-seven graduates of these schools. The college course covers three years.

Dairy Tests and Competitions.—The pure-bred dairy herd test conducted under the direction of S. G. Carlyle of the Department of Agriculture closed on April 1. The competition is open to all owners of pure-bred dairy cows in the province and is conducted under rules substantially the same as those of the Canadian Record of Performance Tests.

The awards were as follows:——

First—Glen White, Lacombe	13,124
Second—Norman Michener, Red Deer	12,551
Third—H. J. Smith, Clover Bar	11,416
Fourth—C. Julian Sharman, Red Deer	10,162

It is the intention of the department to discontinue the testing of pure-bred herds. This work is covered by the Canadian Record of Performance Tests. Additional attention will be given to the tests for grade herds as this work touches a much larger constituency and applies to representative and average conditions to a greater extent than the pure-bred competitions do. The schools of agriculture are made the centres from which the tests are directed and carried on and the schools through their graduates and also their general influence on the people of the districts in which the schools are situated have been able to do a great deal towards strengthening and giving effect to cow-testing work.

Competitions closing on April 1 were conducted at each of the schools at Claresholm, Olds and Vermilion. The competitions were open to all students who had attended the schools and likewise to farmers within a radius of twenty miles of one of the schools. The number of cows that may be entered is not limited, only grade cows are admitted and the competition runs for two hundred and forty days from the date of freshening. The department furnishes scales and sheets and conducts a regular inspection. This year, all the competitions were well filled. Ten prizes were awarded at each centre and the prizes were all live-stock prizes, the first four being calves varying from one year old down to four months, of the Shorthorn, Jersey, Ayrshire and Holstein breeds; four other were of young pigs and two were of pens of poultry. The nature of the prizes has given great interest to the competitions, especially as many of the competitors are young people, who in winning a prize are attaining to the status of owners of good stock.

SESSIONAL PAPER No. 15c

FEDERAL SUBSIDY OF 1914-15.

SUMMARY STATEMENT TO MARCH 31, 1914.

Sec. No.	Classification.	Grant, 1914-1915.	Balance Forward, April 1, 1914	Total.	Expended to Mar. 31, 1915	Unexpended Balance, Mar. 31, 1915
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1	Schools of Agriculture					
	(a) Operation	36,000 00	0 37	36,000 37	37,483 04	
	(b) Equipment		3,574 49	3,574 49	1,334 58	2,239 91
	(c) Buildings	6,000 00		6,000 00	7,120 61	
	(d) Library	1,000 00		1,000 00	236 40	763 60
2	Demonstration Farms		4,472 70	4,472 70	4,162 80	309 90
3	Instruction in Dairying	4,000 00	43 98	4,043 98	3,971 43	72 55
4	Domestic Science		576 74	576 74	562 79	13 95
5	Dairy Competitions	4,000 00	473 71	4,473 71	2,016 00	2,457 71
6	Miscellaneous	310 41	467 40	777 81		777 81
	Totals	51,310 41	9,609 39	60,919 80	56,887 65	6,635 43
				Over-expended balances—		
				See. 1a		$1,482 67
				See. 1c		1,120 61
						$2,603 28

FEDERAL SUBSIDY OF 1913-14.

SUMMARY STATEMENT TO MARCH 31, 1914.

Section No	Classification.	Grant 1913-14.	Expended to Mar. 31, 1914.	Balance Unexpended Mar. 31, 1914.
		$ cts.	$ cts.	$ cts.
1	Schools of Agriculture	31,500 00		
	(a) Operation 18,000		17,999 63	0 37
	(b) Equipment 9,000		5,425 51	3,574 49
	(c) Buildings 4,500		5,101 34	
2	Demonstration Farms	8,000 00	3,527 30	4,472 70
3	Instruction in Dairying	3,000 00	2,956 02	43 98
4	Domestic Science	2,000 00	1,423 26	576 74
5	Dairy Competitions	1,000 00	526 29	473 71
6	Miscellaneous	594 95	127 55	467 40
	Totals	46,094 95	37,086 90	9,609 39

DETAILS OF EXPENDITURE OF GRANTS OF 1913-14 AND 1914-15, TO MARCH 31, 1915.

1.—Schools of Agriculture.

(a) OPERATION.

Grant, 1913-14	$ 18,000 00	
" 1914-15	36,000 00	
Expended to March 31, 1915	.....	$ 55,482 67
Balance overexpended March 31, 1915	1,482 67	
Total	$ 55,482 67	$ 55,482 67

1.—Schools of Agriculture.—Continued.

(*a*) OPERATION.—*Continued.*

	1913-14.	1914-15.
Staff salaries	$ 9,640 28	$ 27,463 19
G. W. Scott, Provincial Dairy Instructor (part salary)	.....	300 00
W. H. McNally, Services, teaching, (part salary)	.....	200 00
A. V. Mitchener, Services, teaching, (part salary)	.....	100 00
Miss Mary MacIsaacs, Supt. Women's Institutes, (part salary)	.....	100 00
Miss Lottie Wood, Stenographer, salary	96 75	—
Miss Edith Murray, Stenographer, salary	265 00	—
Miss Dorothy Thomson, Stenographer, salary	20 00	—
Total	$ 10,022 03	$ 28,163 19
Sundry persons, expenses	2,292 96	2,183 32
Printing, postage, stationery, advertising	2,100 00	1,040 53
Fuel, light, water	507 85	915 39
Labour, materials	2,351 07	1,737 26
Furnishings, supplies, seeds and plants, etc	166 38	2,393 85
Miscellaneous	559 34	441 14
Expenses Board of Agricultural Education Conference	.....	325 72
Students' fares	.....	98 00
Stove, seeder, meter, etc	.....	184 64
Total	$ 17,999 63	$ 37,483 04

(*b*) EQUIPMENT.

Grant, 1913-14	$ 9,000 00	
Expended to March 31, 1915	.....	$ 6,760 09
Balance unexpended March 31, 1915	.....	2,239 91
Total	$ 9,000 00	$ 9,000 00

Supplies and furnishings		$ 1,729 89
Labour and materials, 3 schools (principally dairy buildings)		1,190 48
Miscellaneous		121 97
Equipment—		
Three motor cars	$ 2,180 00	
Three typewriters	345 00	
Pump and cooler	47 60	
Steam boilers	166 66	
Stoves	133 81	
Pumps	39 20	
Motor accessories	105 40	
Tanks	119 35	
Cheese presses	112 50	
Machinery and farm implements	434 35	
Various other items	33 88	
		3,717 75
Total		$ 6,760 09

(*c*) BUILDINGS.

Grant, 1913-14	$ 4,500 00	
" 1914-15	6,000 00	
Expended to March 31, 1915	.....	$ 11,620 61
Balance overexpended March 31, 1915	1,120 61	
Total	$ 11,620 61	$ 11,620 61

SESSIONAL PAPER No. 15c

1.—Schools of Agriculture.—Continued.

(*c*) BUILDINGS.—*Continued.*

Labour, blacksmith and carpenter shops, Vermilion and Olds, and extras at Claresholm		$ 1,875 77
Materials, blacksmith and carpenter shops, Vermilion and Olds, and extras at Claresholm		2,464 84
Contracts—		
Ferguson and Knight, contract price, blacksmith and carpenter shop, Claresholm	$ 1,450 00	
Binnacombe and Glassford, box-stall barn at Vermilion, on account	1,930 00	
T. H. Patterson, box-stall barn at Olds, contract price	1,875 00	
S. M. Ferguson, box-stall barn at Claresholm, contract price	2,025 00	
		7,280 00
Total		$ 11,620 61

(*d*) LIBRARY.

Grant, 1914-15	$ 1,000 00	
Expended to March 31, 1915		$ 236 40
Balance unexpended March 31, 1915		763 60
Total	$ 1,000 00	$ 1,000 00

This expenditure was entirely for books.

2. Demonstration Farms.

Grant, 1913-14	$ 8,000 00	
Expended to March 31, 1915		$ 7,690 10
Balance unexpended March 31, 1915		309 90
Total	$ 8,000 00	$ 8,000 00
Purchase price and keep of animals, less refund for animals sold		$ 7,690 10

This appropriation was for the purpose of purchasing additional stock for the demonstration farms. The following animals were purchased by the superintendent in Ontario and Quebec:—

1 Pure-bred Shorthorn bull	$ 162 50
11 " cows	2,350 00
1 " Ayrshire bull	125 00
1 " " cow	400 00
31 Grade Holstein and Ayrshire cows	3,810 00
Freight, feed, attendance, testing, registering, commissions, etc.	824 60
Total	$ 7,690 10

The above animals were distributed as follows: Athabaska Landing, 24; Stony Plain, 5; Sedgewick, 2; Claresholm, 14; Olds, 5; Vermilion, 4; Medicine Hat, 9.

3.—Instruction in Dairying.

Grant, 1913-14	$ 3,000 00	
" 1914-15	4,000 00	
Expended to March 31, 1915		$ 6,927 45
Balance unexpended March 31, 1915		72 55
Total	$ 7,000 00	$ 7,000 00

3.—Instructions in Dairying.—Continued.

S. G. Carlyle, Superintendent, salary ($3,000)		$ 5,162 50
" " expenses		1,146 82
G. H. Scott, Instructor, expenses		44 30
Demonstration farms, expense account		**280 00**
Equipment and supplies		130 73
Miscellaneous		163 10
Total		$ 6,927 45

4.—Domestic Science.

Grant, 1913-14	$ 2,000 00	
Expended to March 31, 1915	.....	$ 1,986 05
Balance unexpended March 31, 1915	.....	13 95
Total	$ 2,000 00	$ 2,000 00

Miss M. M. Goldie and Miss N. Lawson, Instructors, salaries	$ 1,283 40	
Miss M. M. Goldie, expenses	258 09	
Miss N. Lawson, expenses	16 30	
		$ 1,557 79
Supplies and utensils		376 85
Miscellaneous		51 41
Total		$ 1,986 05

Miss Goldie and Miss Lawson are now attached to the schools at Olds and Claresholm respectively, and their salaries for 1914-15 were charged to that account.

5.—Dairy Competitions.

Grant, 1913-14	$ 1,000 00	
" 1914-15	4,000 00	
Expended to March 31, 1915	.....	$ 2,542 29
Balance unexpended March 31, 1915	.....	2,457 71
Total	$ 5,000 00	$ 5,000 00

Purchase of stock for prizes	$ 446 53
Sundry persons, expense accounts	748 03
Stenographic assistance	110 00
Prizes	120 00
Equipment (scales)	542 16
Supplies, furnishings and miscellaneous	498 69
Printing and stationery	76 88
Total	$ 2,542 29

6.—Miscellaneous.

Grant, 1913-14	$ 594 95	
" 1914-15	310 41	
Expended to March 31, 1914	.....	$ 127 55
Balance unexpended March 31, 1915	.....	777 81
Total	$ 905 36	$ 905 36

Express charges	$ 51 55
Light and fittings, rink, Claresholm	**76 00**
Total	$ 127 55

Nothing expended in 1914-15.

SESSIONAL PAPER No. 15c

Federal Appropriation to the Province of Alberta under the Agricultural Aid Act, 1912.

	Vote.	Expenditure.
Dairy Shorthorns	$ 10,000 00	$ 15,568 23
Women's Institutes and Domestic Science	3,500 00	3,655 98
Live Stock Demonstration Train	5,000 00	5,023 79
Excursions to Experimental Farms	600 00	262 89
To increase stock of Poultry Station	2,500 00	2,499 80
Exhibit at Dry Farming Congress	2,000 00	2,416 91
Expenses bringing in cows to sell to farmers	2,000 00	
Miscellaneous	494 95	
	$ 26,094 95	
Accrued interest	199 05	
Sales of Animals	3,800 12	
Balance credited to Dairy Shorthorn Herd Nov. 30, 1915	.....	666 52
Total	$ 30,094 12	$ 30,094 12

Comparative Statement of Expenditure of Provincial Funds for Agricultural Purposes, for the Years 1912, 1913, 1914, and 1915.

Service.	1912.	1913.	1914.	1915
	$ cts.	$ cts.	$ cts.	$ cts.
Civil Government	29,521 21	30,329 30	36,911 29	48,329 94
Live Stock—				
Live Stock and Agricultural Institutes and Associations; Fat Stock Shows; Destruction of Wolves; Stock Inspection; Brands and Brand Book; Grants to Live Stock Associations; Spring Stock Show	36,619 46	44,789 38	60,981 07	47,736 83
Fairs and Exhibitions; Official Judges, Production of Pure Seed Grain, and Seed Fair, Fairs Association, etc	79,096 73	95,826 51	107,365 49	117,226 18
Poultry—				
To encourage Poultry Industry; Grant to Poultry Association	5,778 84	8,972 65	8,547 83	8,300 37
Dairying—				
Advances to Creameries; to encourage dairy work	80,561 90	111,710 36	175,024 84	249,851 53
Demonstration Farms—				
Administration and Operation	35,911 07	73,620 58	66,840 44	70,231 95
Schools of Agriculture—				
Operation; Agricultural instruction; Scholarships	2,075 85	3,605 95	1,375 40	20,503 11
Statistics; Protection of Game; Prairie Fires	23,549 90	34,270 19	48,373 26	45,371 79
Grants; United Farmers, Irrigation Association, Women's Institutes, Destruction of Noxious Weeds, Natural History Society	34,943 08	30,591 45	31,708 08	27,640 66
Bacteriological and Pathological Work	8,358 86	7,705 80	9,000 00	9,000 00
Extension of Markets	824 60			
Sundries and contingencies	1,170 75	1,003 51	500 00	1,694 19
	338,412 25	442,425 68	546,627 70	645,786 55
Less Revenue	62,386 70	202,268 00	272,318 00	342,086 00
	276,025 55	240,157 68	$274,309 70	$303,700 55

BRITISH COLUMBIA.

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

Farm Demonstration and Experimental Plots, Alfalfa Demonstration and Experimental Plots, Soil and Crop Investigation Work, Co-operative Variety Tests, Dairy Farm Demonstration Work, Field Crop Competitions	$ 10,000 00
Poultry Demonstration Stations	1,500 00
Boys' and Girls' Field Crop Competitions	1,115 00
Cow Testing Association Work	3,000 00
Horticultural Demonstration Plots	4,000 00
Experimental Work in Vegetable Growing and Greenhouse work	1,500 00
Pathological and Entomological Investigation Work	500 00
Expenses of Fruit Packing Competitions and Fruit Packing Schools	1,000 00
Appointment of Instructors in the different phases of Agriculture and Horticulture	8,819 00
Towards preparing and printing Bulletins and Circulars of Instruction and Education and Miscellaneous Printing	181 00
Appointment of Instructors towards the suppression of Noxious Weeds	4,000 00
Department of Education, Agricultural Instruction in Schools	15,000 00
Miscellaneous	2,184 38
Total	$ 52,799 38

OUTLINE OF WORK PERFORMED.

The province of British Columbia received as its share of the annual allotment of the subsidy under the Agricultural Instruction Act, the sum of $52,799.38 for 1914-15. This money is spent partly by the Department of Agriculture in its various lines of instruction and demonstration work, and partly by the Department of Education, to supplement the grants made from provincial funds.

In 1915 the Department of Education decided to include agriculture as an optional subject in the high schools. School-gardening is already being emphasized in the public schools as a method of conducting nature-study and instruction in elementary agriculture. The older boys and girls are also encouraged to enter the field crop competitions under the direction of the Farmer's Institutes. It is anticipated that the interest created by such means in agricultural studies will lead many to pursue this branch of study after leaving the public school. As this will necessitate the appointment of teachers who are trained specialists in agriculture, it will not be possible to have this subject taught in all the high schools for some time to come.

The high schools of the province are distributed as follows: Victoria (Victoria College); Vancouver (Vancouver College); New Westminster, Nanaimo, Nelson, Rossland, Cumberland, Vernon, Kaslo, Chilliwack, Grand Forks, Kamloops, Revelstoke, Armstrong, Golden, Duncan, Salmon Arm, Peachland, Penticton, Kelowna, Summerland, and North Vancouver.

In 1914, Mr. J. W. Gibson, M.A., formerly science master in the Ottawa Normal School, was appointed director of elementary agricultural education for the province. The position thus created was provided for under the Federal subsidy. Following this appointment, a summer school for teachers in rural science was held at Victoria in July, 1914, with the object of qualifying teachers to take up high school work in

agriculture. The response on the part of the teachers was marked. One hundred and seventy-one completed the course and were given interim certificates. These teachers were offered a second, and more advanced course in 1915, and the preliminary course was continued. Teachers who complete the second course will be given a rural science diploma, which will entitle them to special grants as teachers of that subject.

In addition to teaching agriculture proper, these teachers will assist in the regular science work of the high schools. They will also spend a part of each week supervising the work in elementary agriculture and school gardening in the public schools. In high schools where rural science is taught, extension classes will be opened for young men who are not regular students and who can give only a portion of their time to such studies.

In brief the plans of the department are as follows: The special training of teachers in rural science; special grants to teachers and school boards where rural science is taught, grants to school boards in aid of general school ground improvement, establishing a provincial schools' nursery, agricultural instruction in high schools with direct supervision of related public school work.

Boys' and Girls' Crop Competitions: The need for boys' and girls' clubs, or like associations, has been felt in British Columbia. No distinct clubs of this nature have as yet been formed, but a foundation has been laid by creating within the Farmers' Institutes a junior phase, thus making use of the older members of a community to offer encouragement and suggestions to any boys' and girls' organizations. Hitherto the work has been confined to potato competitions. Junior potato competitions were held by twenty farmers' institutes last year. The number has increased for 1915, which is a good indication that there is an increased interest. A bulletin containing a brief description of the approved methods of potato culture and the rules and regulations of the competition is sent to each boy and girl entered in the competition. In the same bulletin is a summary of last year's competition.

A stipulation worthy of note in the junior competition was that all competitors within an institute district had to use the same variety; it being recognized that to reduce the strains grown to a limited number of standard varieties adapted to the district would materially assist in marketing, especially in the districts getting into the car-shipping class. The awards are based on three scores, a field score, a harvested product score, and a score on a financial statement. The financial statement is sent in on card forms. These when filled out by the competitors are simply statements of the expenses and receipts in handling the plots entered in competition. All competitors use the uniform tariff of charges contained on the card, and the statements must be certified correct by a representative of the local Farmers' Institute.

In 1914, each entrant was required to send a twenty-pound exhibit from his plot to the Dominion Exhibition at Victoria. In the present year, the exhibits will be sent to the provincial seed fairs at New Westminster and Armstrong, or wherever local seed fairs are held by the Farmers' Institute, where the awards will be made. Transportation charges are paid. To the boy securing the highest total score, including field score, tuber score, and value of report, the department offers a pure-bred heifer calf, of the breed of his choice, and to the girl taking the highest total score, a high-grade sewing machine. Wherever possible, the opportunity is taken after the awards are made to discuss with the boys and girls the mistakes made and the lessons learned. This year the question of introducing other crops will be taken up. Arrangements are now being made whereby the junior divisions of the Farmers' Institutes will be regularly organized into clubs.

Field Crop Competitions.—The field crop competitions in potatoes have become an important phase of the work of the department. In 1914, forty-two competitions in potatoes were conducted through the Farmers' Institutes. The announcement of

this competition was published in a bulletin form containing a brief description of the most approved cultural methods, and copies were distributed to all members of Farmers' Institutes. The competitive spirit led large numbers of farmers to handle their potato crop along approved lines. Many valuable demonstrations resulted, the more noticeable of which were fertilizing tests and the value of Bordeaux mixture as a spray. In many cases good results were also reported in using the formalin solution as a preventive for scab. The minimum size of a plot entered in the competition was one-half acre. Awards were based on a field score. A bonus is offered to any competitor who will send in a satisfactory statement of the cost of production of the crop entered, not only to provide valuable data, but to encourage the farmers to keep crop records.

Dairy Demonstrations.—The British Columbia Dairymen's Association conducts annually a dairy farm competition, in which awards are given for the best equipped and conducted plants and the best managed farms and herds. The average number of contestants is from twelve to fifteen. Expenses are met by the grant. Owners of grade milch cows who form themselves into associations may secure the services of testers sent out by the department. Official tests of pure-bred herds are also conducted. The transportation of testers is paid and an allowance of one dollar per day is made from the grant towards the salaries of the men conducting official tests.

Poultry Work.—Egg-laying contests open to all comers are conducted annually. Poultry breeding stations have been established at a number of points, pens of pure-bred stock being supplied to men selected to carry on the work.

Demonstration Plots, etc.—The demonstration work carried on includes the operation of six small stations to demonstrate systems of cropping best suited to the districts where they are located. These stations are located at Chilliwack, Armstrong, Rosehill, Edgewood, Grand Forks and Rock Creek. Land of poor to average quality was chosen in each case, and an endeavour is being made to restore the land to profitable production by methods within the reach of the average farmer. At Armstrong the land chosen was regarded locally as an almost unworkable clay; at Rock Creek, nineteen consecutive crops of grain had been grown. The plots were chosen with the idea of solving, if possible, difficulties that were common to the districts. In all cases the department had the advice of an advisory committee of three appointed by the local Farmers' Institute. This committee is not only a safeguard against errors in detail that might creep in through lack of a thorough knowledge of the district, but it also tends to secure the sympathy and co-operation of the members of the institute.

To demonstrate alfalfa twelve plots have been located at different points throughout the province. At all interior points the alfalfa did well but the success of the plots in coast districts was not so marked.

Silo demonstration work played an important part in the year's programme. Five silos were built by the department and filled with corn. A test was also made to ascertain the possibilities of sweet-curing of clover in a silo. The silo demonstrations received the enthusiastic support of the farmers in all districts where demonstrations were held. The aim of the department was to erect cheap but efficient silos of a type that could be constructed by the farmers themselves.

Miscellaneous experiments were carried on by the department, including clover pasture for hogs, kale growing, approved grass-seed mixtures and fertilizers for fodder crops.

Seed Distribution.—In order to stimulate the production of better seed in the province, the department distributed registered seed on a fairly extensive scale during the late winter and spring of 1915. All seed was distributed through the farmers' institute organization. The following amounts and kind of seed were distributed:—

	Pounds.
Oats, Registered Banner (3rd generation)	37,700
Oats, Gold Rain	81,600
Wheat, Marquis	17,000
Corn, Minnesota (special strain)	3,075
Corn, Northwestern Dent (special strain)	3,180
Corn, Quebec 28 (Acclimated)	1,000
Mangel Seed Sludgstrop (registered Denmark)	2,240
Alfalfa Northern Crown Variegated	2,500
Alfalfa, Grimm	300

To stimulate the growing of the two important crops, corn and alfalfa, the department undertook to distribute small lots of these seeds. Five pound packages of alfalfa seed were sent out to eight members of any institute whose names were forwarded to the department through the institute. Three varieties of corn in three pound lots were also sent out to the first eight applications received through the institute. Report forms, to be filled out and forwarded to the department, were sent with the corn and alfalfa. 560 applicants secured 5 lbs. alfalfa, 528 applicants secured 3 lbs. corn (3 varieties).

From these reports the department will be able to ascertain fairly accurately as to the prospect of successful alfalfa and corn production in the various districts of the province; and at the same time data is secured as to the merits of the various corn varieties for the different districts.

Horticultural Demonstration Plots and Vegetable and Greenhouse Experiments.—Five acre experimental plots are being operated at four points in northern British Columbia to demonstrate the culture of vegetables, small fruits, grains and grasses as adapted to the districts.

A demonstration and experiment station is being conducted at Summerland in the Southern Okanagan valley, in co-operation with Mr. J. L. Hilborn. This plot will be operated for three years and demonstrate cultural methods and varieties of market garden and small fruit crops.

Experiments with fertilizers for small fruits and vegetables and in the spraying of vegetables were conducted at Ladner, Hammond, Mission, Chilliwack, Salmon Arm and Armstrong.

An experiment is being conducted at Kelowna in the culture of onions, with a view to prolonging the storage life of the product and thus extending the period of marketing.

The horticulturists and their assistants give demonstrations and practical instruction in pruning, spraying, thinning and other orchard operations, besides assisting in the regular work connected with the demonstration plots at those points, and in co-operative experiments.

The following assistants were appointed in 1914 at the points named, and their remuneration provided by the federal subsidy: L. F. Burrows, Salmon Arm; H. M. Scott and E. C. Hunt, Nelson; H. M. Howitt, Prince Rupert.

FEDERAL SUBSIDY OF 1914-15.

SUMMARY FINANCIAL STATEMENT TO MARCH 31, 1915.

Section No.	Classification.	Grant 1914–15.	Expended Mar. 31, 1915.	Balance Unexpended Mar. 31, 1915.
		$ cts.	$ cts.	$ cts.
1	Farm Demonstrations, etc.	10,000 00	9,881 11	118 89
2	Poultry Demonstration Stations	1,500 00	1,491 03	8 97
3	Children's Crop Competitions	1,115 00	1,115 00	
4	Cow-Testing Associations	3,000 00	499 98	2,500 02
5	Horticultural Demonstrations	4,000 00	2,651 90	1,348 10
6	Vegetable Experiments	1,500 00	1,478 55	21 45
7	Insects and Plant Diseases—investigations	500 00		500 00
8	Fruit-Packing	1,000 00		1,000 00
9	Agricultural Instructors	8,819 00	8,813 66	5 34
10	Printing and Preparing Bulletins, etc.	181 00	181 00	
11	Weed Suppression	4,000 00	3,998 32	1 68
12	Agricultural Instruction in Schools	15,000 00	11,613 60	3,386 40
13	Miscellaneous	2,184 38	2,084 20	753 56
	Total Grant	52,799 38		
	Balances from 1913–14 Grant, debited to Miscellaneous, as authorized	635 38		
	Totals	53,452 76	43,808 35	9,644 41

DETAILS OF EXPENDITURE, APRIL 1, 1914, TO MARCH 31, 1915.

1.—Farm Demonstration and Experimental Plots.

Grant, 1914-15	$ 10,000 00	
Expended to March 31, 1915	.....	$ 9,881 11
Balance unexpended March 31, 1915	.....	118 89
Total	$ 10,000 00	$ 10,000 00

Salaries—		
R. J. Ferris, Silo operator	$ 300 00	
W. Newton, Instructor, soil and crop	1,010 32	
		$ 1,310 32
Seed, supplies, fencing		3,883 49
Freight		517 41
Labour		1,383 37
Equipment		256 66
Prizes, crop competitions, etc.		4,520 00
Miscellaneous expenses		342 21
Rent of land for demonstration plots		308 00
Judging expenses		743 67
Total		$ 13,265 13
Less refund seed grain sold		3,444 82
Total		$ 9,820 31

The Department operates two silo filling outfits, supplies plans of silos, sends men to superintend erection and later superintends filling—all for demonstration purposes, to encourage silo construction and corn growing. W. Newton is permanently employed in soil and crop work, crop demonstrations and field crop competitions.

2.—Poultry Demonstration Stations.

Grant, 1914-15	$ 1,500 00	
Expended to March 31, 1915	.....	$ 1,491 03
Balance unexpended March 31, 1915	.....	8 97
Total	$ 1,500 00	$ 1,500 00
W. H. Stroyan, caretaker, Egg-contest, part salary		$ 541 97
Premiums to station caretakers		225 00
Purchase of poultry		55 63
Prizes		370 00
Supplies		288 85
Expenses		9 60
Total		$ 1,491 03

3.—Children's Field Crop Competitions.

Grant, 1914-15	$ 1,115 00	
Expended to March 31, 1915	.....	$ 1,115 00
Total	$ 1,115 00	$ 1,115 00
Children's prizes, field crops		$ 377 25
W. Gibson, salary and expenses, judging		481 90
Incidental expenses		255 85
Total		$ 1,115 00

4.—Cow-testing.

Grant, 1914-15	$ 3,000 00	
Expended to March 31, 1915	.....	$ 499 98
Balance unexpended March 31, 1915	.....	2,500 02
Total	$ 3,000 00	$ 3,000 00
C. H. Gravely, cow-tester	95 00	
D. James, "	100 00	
E. Rive, "	99 00	
J. B. Watson, "	75 00	
A. White, "	20 00	
W. E. Wiltshire, "	60 00	
S. J. Thomas, " expenses	6 60	
D. Digby, " "	9 75	
G. H. Thornberry, " "	25 40	
		$ 490 75
Milk testing		5 36
Supplies		3 87
		$499 98

Cow-testing supplements work of Dominion Department, and is not confined to registered stock.

5.—Horticultural Demonstration Plots.

Grants, 1914-15	$ 4,000 00	
Expended to March 31, 1915	.....	$ 2,651 90
Balance unexpended March 31, 1915	.....	1,348 10
Total	$ 4,000 00	$ 4,000 00
Salaries—		
E. C. Hunt, Assistant Horticulturist	$ 800 00	
S. LeC. Grant, rancher	400 00	
		$ 1,200 00
Labour		1,016 15
Supplies		68 05
Expenses		367 70
Total		$ 2,651 90

Grant is engaged for six months at Bella Coola supervising demonstration plots

6.—Vegetable Growing and Greenhouse Work.

Grant, 1914-15	$ 1,500 00	
Expended to March 31, 1915	.....	$ 1,478 55
Balance unexpended March 31, 1915	.....	21 45
Total	$ 1,500 00	$ 1,500 00

Re Experiments in growing vegetables and small fruits, as per 3-year agreement, June 8, 1914	$ 1,000 00
Purchase onions for storage experiment	184 60
Rental storage warehouse for experiment	29 00
Building storage room for experiment	188 45
Supplies and labour, Oak Bay plot	76 50
Total	$ 1,478 55

J. L. Hillborn, of Summerland, who is paid $1,000 a year by contract—made a demonstration station of his farm; vegetables and crops under glass; a very great extension of production resulted.

Onions stored at Kelowna as demonstration.

9.—Instructors in Agriculture.

Grant, 1914-15	$ 8,819 00	
Expended to March 31, 1915	.....	$ 8,813 66
Balance unexpended March 31, 1915	.....	5 34
Total	$ 8,819 00	$ 8,819 00

Salaries—	
R. C. Abbott, Markets Commissioner	$ 450 00
R. H. Baird, Weed Inspector	90 00
W. T. Brookes, Veterinary Inspector	533 30
W. H. Cartwright, Agricultural Surveyor	100 00
Mrs. M. S. Davies, Sec. Board of Women's Institutes	160 00
M. H. Howitt, Assistant Horticulturist	700 00
E. C. Hunt, Assistant Horticulturist	200 00
Miss B. Livingstone, Lecturer, Women's Institutes	308 00
W. T. McDonald, Live Stock Commissioner	54 15
D. H. McKay, Veterinary Inspector	600 00
R. L. Ramsay, Agriculturist	625 00
M. H. Ruhmann, Assistant Plant Pathologist	500 00
H. M. Scott, Assistant Horticulturist	41 90
M. Sparrow, Veterinary Inspector	600 00
W. H. Stroyan, Caretaker, Egg Contest	150 00
Miss A. M. Taylor, Lecturer, Women's Institutes	104 00
H. E. Upton, Assistant Poultry Instructor	33 35
Madame M. Grohe, Dressmaking	66 40
E. Weddell, Enumerator, Farm Surveys	100 00
R. M. Winslow, Provincial Horticulturist	21 66
	$ 5,437 76
Expenses of above	3,375 90
Total	$ 8,813 66

10.—Preparing and Printing Bulletins.

Grant, 1914-15	$ 181 00	
Expended to March 31, 1915	.....	$ 181 00
Total	$ 181 00	$ 181 00

Printing 1,000 copies short course programme	$ 16 00
Expenses, revision of Bulletin No. 30	165 00
Total	$ 181 00

11.—Weed Suppression.

Grant, 1914-15	$ 4,000 00	
Expended to March 31, 1915	.....	$ 3,998 32
Balance unexpended March 31, 1915	.....	1 68
Total	$ 4,000 00	$ 4,000 00
Salaries—		
H. V. Ackland, Weed Instructor and Inspector	$ 90 00	
F. Adie, " "	186 00	
R. H. Baird, " "	153 87	
R. H. Hickey, " "	264 20	
C. Hodgkinson, " "	240 00	
W. Johns, " "	180 00	
H. Wren, " "	180 00	
		$ 1,294 07
Labour		631 90
Expenses of Inspectors		2,072 35
Total		$ 3,998 32

12.—Agricultural Instruction in Schools.

Grant, 1914-15	$ 15,000 00	
Expended to March 31, 1915	.....	$ 15,000 00
Total	$ 15,000 00	$ 15,000 00

The following statement shows that the Department of Education expended the sum of $24,506.90, of this amount $15,000 was provided from the Federal grant and the balance from provincial appropriations.

ELEMENTARY AGRICULTURE.

Summer school for Teachers—		
Teachers' transportation	$ 1,256 00	
" per diem allowance while attending summer school	4,769 00	
Supplies and equipment	1,041 00	
Instructors and assistants	533 00	
Caretakers and office expenses	152 00	
Allowance for expenses to Victoria School Board	100 00	
		$ 7,851 00
Grants to school gardens		420 00
Expenses in connection with school gardening at Victoria Normal school		250 00
Salary of Director (9 months)	$ 2,250 00	
Travelling expenses	562 60	
Books, periodicals and office equipment	280 00	
		$ 3,092 60
Total		$ 11,613 60

DOMESTIC SCIENCE.

Summer School for Teachers—		
Teachers' transportation	$ 792 00	
" per diem allowance while attending summer school	3,147 00	
Supplies and equipment	162 00	
Instructors and assistants	882 00	
Caretakers and office expenses	150 00	
		$ 5,133 00
Cost of equipment and supplies for 6 domestic science centres		4,502 00
Salaries of Instructors (7 months)	$ 2,500 00	
Travelling expenses (7 months)	818 30	
		3,318 30
Total		$ 12,953 30

13.—Miscellaneous.

Grant, 1914-15	$ 799 38	
Balance brought forward from 1913-14	653 38	
Transferred from Section No. 3	1,385 00	
Expended to March 31, 1915	.....	$ 2,145 00
Balance unexpended March 31, 1915	.....	692 76
Total	$ 2,837 76	$ 2,837 76
Women's Institutes—		
Conference expenses		$ 47 10
Flower show grant		62 00
Mde. Grohe, Instructor in dressmaking		93 80
Prizes Women's Institute competition		75 00
Expenses, Board of Women's Institutes		35 00
Mrs. A. M. Taylor, Lecturer, salary and expenses		211 75
Salaries, Women's Institute secretaries		1,062 35
Total		$ 1,587 00
Lantern slides, Farmers' Institutes		$ 114 15
Fruit storage		18 90
Summerland pre-cooling plant		351 40
Labour re weeds		12 75
Poultry for breeding stations		60 80
Total		$ 2,145 00

Federal Subsidy of 1913-14.

Summary Financial Statement.

Section No.	Classification.	Grant.	Expended to May 8, 1915.	Balance Unexpended.
		$ cts.	$ cts.	$ cts.
1	Short Courses, Women's Institutes	2,498 30	2,498 30	.....
2	Short Courses, Farmers' Institutes	4,992 37	4,992 37	.....
3	Demonstrations, Farm Crops	7,478 04	7,478 04	.....
4	Demonstrations, Dairying	4,994 62	4,994 62	.....
5	Demonstrations, Horticulture	4,993 75	4,993 75	.....
6	Cow-Testing Association Work	2,499 34	2,499 34	.....
7	Instructors and Inspectors in Agr	7,499 25	7,499 25	.....
8	School Gardens	999 65	999 65	.....
9	Demonstration, Field Work	2,496 96	2,496 96	.....
10	Stock Judging Competitions	990 60	990 60	.....
11	Fruit Packing Competitions	410 00	410 00	.....
12	Preparing Bulletins	2,495 15	2,495 15	.....
13	Miscellaneous	4,986 73	4,333 35	653 38
		47,334 76	46,681 38	653 38

Federal Subsidy of 1913-14.

Details of Expenditure.

1.—Short Courses, Domestic Science.

Grant, 1913-1914	$2,498 30	
Expended to May 8, 1915	.....	$2,498 30
Total	$2,498 30	$2,498 30
Salaries—		
Madame M. Grohe, instructor in dressmaking	$676 00	
Miss B. Livingstone, lecturer	616 00	
Miss A. M. Taylor, lecturer	484 00	
		$1,776 00
Expenses		686 75
Prizes		35 55
Total		$2,498 30

2.—Farmers' Institute, Short Courses.

Grant, 1913-14	$4,992 37	
Expended to May 8, 1915	.....	$4,992 37
Total	$4,992 37	$4,992 37
Salaries—		
L. F. Burrows, horticulturist	$100 00	
W. H. Cartwright, agricultural surveyor	300 00	
Mrs. M. S. Davis, secretary, Board of Women's Institutes	40 00	
L. Harris, foul brood inspector	375 00	
M. H. Howitt, horticulturist	100 00	
W. T. McDonald, Live Stock Commissioner	75 81	
D. H. McKay, veterinary inspector	360 00	
R. L. Ramsay, agriculturist	345 83	
M. H. Ruhmann, plant pathologist	100 00	
W. J. Sheppard, foul brood inspector	375 00	
M. Sparrow, veterinary inspector	360 00	
T. D. Todd, foul brood inspector	375 00	
H. E. Upton, poultry instructor	33 35	
R. M. Winslow, provincial horticulturist	75 81	
		$3,015 80
Expenses, short courses		1,912 62
Lantern slides		63 95
Total		$4,992 37

3.—Demonstrations—Farm Crops.

Grant, 1913-14	$7,478 04	
Expended to May 8, 1915	.....	$7,478 04
Total	$7,478 04	$7,478 04
Salaries—		
R. J. Ferris, silo demonstrator	$150 00	
W. H. Stroyan, caretaker, egg contest	525 00	
		$675 00
Materials, seeds and supplies for experimental plots and poultry competition		5,925 32
Labour		1,594 56
Poultry grants and premiums		175 00
Freight and incidentals		770 53
Total		$9,140 41
Less refunds on seed		1,662 37
Total		$7,478 04

4.—Demonstrations in Dairying.

Grant, 1913-14	$4,994 62	
Expended to May 8, 1915	.....	$4,994 62
Total	$4,994 62	$4,994 62
Salaries—		
W. H. Cartwright, agricultural surveyor	$200 00	
L. Harris, foul brood inspector	250 00	
D. H. McKay, veterinary inspector	240 00	
R. L. Ramsay, agriculturist	250 00	
M. H. Ruhmann, plant pathologist	200 00	
H. M. Scott, horticulturist	50 00	
W. J. Sheppard, foul brood inspector	250 00	
M. Sparrow, veterinary inspector	240 00	
F. D. Todd, foul brood inspector	125 00	
H. E. Upton, poultry instructor	13 34	
H. Wren, weed inspector	90 00	
F. L. Goodman, cold storage investigation	53 33	
		$1,961 67

4.—Demonstrations in Dairying.—Continued.

Expenses	$ 2,051 70
" judging	737 60
Dairy competition prizes	200 00
Supplies and labour	38 45
Miscellaneous	5 20
Total	$4,994 62

5.—Demonstrations in Horticulture.

Grant, 1913-14	$4,993 75	
Expended to May 8, 1915	.....	$4,993 75
Total	$4,993 75	$4,993 75
Salaries—		
L. F. Burrows, horticulturist	$326 65	
S. Le C. Grant	200 00	
M. H. Howitt, horticulturist	300 00	
E. C. Hunt	100 00	
D. Peddie	236 63	
A. Richardson	300 00	
A. H. Ruhmann, plant pathologist	100 00	
H. M. Scott, horticulturist	336 75	
J. Gibb, instructor in packing	92 75	
		$1,992 73
Expenses		1,147 50
Supplies		1,454 12
Labour		263 45
Equipment		60 95
Prizes		75 00
Total		$4,993 75

6.—Cow-testing.

Grant, 1913-14	$2,499 34	
Expended to May 8, 1915	.....	$2,499 34
Total	$2,499 34	$2,499 34
Salaries and wages—		
E. E. Carncross, cow tester	$312 91	
C. H. Gravely, "	527 00	
D. James, "	130 00	
J. B. Watson, "	330 00	
W. R. Wiltshire, "	330 00	
E. Pearson, "	23 15	
G. Sangster, "	20 00	
G. H. Thornberry, "	231 20	
D. E. MacKenzie, "	25 00	
F. Adie, weed inspector	87 00	
C. Hodgkinson, weed inspector	30 00	
		$2,046 26
Expenses		52 85
Testing milk		126 06
Supplies		170 35
Miscellaneous		103 82
Total		$2,499 34

7.—Instructors and Inspectors in Agriculture.

Grant, 1913-14	$7,499 25	
Expended to May 8, 1915	.....	$7,499 25
Total	$7,499 25	$7,499 25

7.—Instructors and Inspectors in Agriculture—Continued.

Salaries—		
M. L. Bird, Inspection Officer	$183 00	
G. G. Brown, Inspection Officer	100 00	
J. M. Brydon, Inspection Officer	50 00	
J. H. Burnett, Enumerator, farm survey	120 00	
W. H. Cartwright, Agricultural Surveyor	100 00	
W. J. Graham, Inspection Officer	200 00	
W. P. Kearns, Enumerator, farm survey	240 00	
C. E. McCubbing, Inspection Officer	50 00	
D. H. McKay, Veterinary Instructor	360 00	
R. A. Robley, Enumerator, farm survey	360 00	
M. H. Ruhmann, Plant Pathologist	200 00	
A. G. Simms, Inspection Officer	100 00	
M. Sparrow, Veterinary Instructor	271 00	
W. H. Stroyan, caretaker, egg contest	75 00	
F. D. Todd, Foul Brood Inspector	125 00	
J. B. Watson, Cow tester	300 00	
E. Weddell, Enumerator	240 00	
E. W. White, Inspection Officer	200 00	
W. E. Wiltshire, Cow tester	300 00	
		$3,574 00
Salaries and Expenses—		
E. Bamhill, Inspection Officer	$142 00	
H. E. Creese, Inspection Officer	53 25	
Capt. De Salis, Enumerator	245 95	
J. H. Ellison, Enumerator	314 15	
W. C. W. Fosbery, Enumerator	275 75	
F. H. Getchell, Inspection Officer	25 80	
F. L. Goodman, Pre-Cooling Expert	36 65	
L. R. Hauhill, Inspection Officer	52 50	
R. H. Helmer, Inspection Officer	32 25	
E. A. Orchard, Enumerator	162 40	
L. W. Patton, Enumerator	367 30	
C. M. Rendell, Enumerator	122 60	
S. Robinson, Instructor Pruning	49 25	
Expenses, sundry persons	2,023 30	
Labour	22 10	
Total		$7,499 25

8.—School Gardens.

Grant, 1913-14	$999 65	
Expended to May 8, 1915	.....	$999 65
Total	$999 65	$999 65
Veterinary and Apiary Inspectors and Instructors—Salaries		$505 00
Expenses		494 65
Total		$999 65

9.—Field Demonstrations.

Grant, 1913-14	$2,496 96	
Expended to May 8, 1915	.....	$2,496 96
Total	$2,496 96	$2,496 96
Silo demonstration outfit		$ 300 00
Judging expenses		616 55
Expenses		177 45
Freight		85 80
Labour, materials and supplies		559 01
Prizes		210 00
Silo filler		548 15
Total		$2,496 96

10.—Stock Judging Competitions.

Grant, 1913-14	$990 60	
Expended to May 8, 1915	.....	$990 60
Total	$990 60	$990 60

Salaries—		
L. Harris, Apiary Inspector and Instructor	$187 50	
W. J. Sheppard, Apiary Inspector and Instructor	62 50	
F. D. Todd, Apiary Inspector and Instructor	125 00	
C. A. Cocks, Inspection Officer	20 50	
R. T. Evans, "	16 25	
W. M. Frith, "	12 50	
R. D. Kerr, "	1 25	
W. H. Winster, "	28 75	
Salaries and Expenses—		
G. E. Wilkinson, Inspection Officer	156 50	
Expenses—		
L. F. Burrows, Assistant Horticulturist	60 90	
Expenses, Inspection Officers, Apiary Inspectors and Enumerators	318 95	
		$990 60
Total		$990 60

11.—Fruit-packing Competitions.

Grant, 1913-14	$ 410 00	
Expended to May 8, 1915	.....	$ 410 00
Total	$ 410 00	$ 410 00
Prize money		$ 410 00

12.—Bulletins and Circulars.

Grant, 1913-14	$ 2,495 15	
Expended to May 8, 1915	.....	$ 2,495 15
Total	$ 2,495 15	$ 2,495 15
Miss A. M. Taylor, Lecturer, Women's Institutes		$ 264 00
Preparing Bulletin No. 53		50 00
Printing judging books		81 00
Printing, etc.		2,100 15
Total		$ 2,495 15

13.—Miscellaneous.

Grant, 1913-14	$ 4,986 73	
Expended to May 8, 1915	.....	$ 4,333 35
Balance unexpended May 8, 1915, carried forward to "Miscellaneous" 1914-15	.....	653 38
Total	$ 4,986 73	$ 4,986 73
Salaries, enumerators farm survey		$ 2,420 90
Expenses, enumerators		1,292 55
Supplies and expenses, pre-cooling investigations		304 20
Fees, statistical report		300 00
Incidentals		15 70
Total		$ 4,333 35

SESSIONAL PAPER No. 15c

AGRICULTURAL AID GRANT, 1912.

To June 17, 1915.

Section No.	Classification.	Grant.	Expended June 17, 1915.	Balance June 17, 1915.
		$ cts.	$ cts.	$ cts.
1	Women's Institutes, etc.	1,000 00	994 05	5 95
2	Fruit Packing and Grading	1,000 00	990 00	10 00
3	Purchase of Grade Dairy Cattle	4,000 00	*4,000 00	
4	(a) Demonstrations in field crops and live stock	10,000 00	4,366 07	2,044 13
	(b) Introduction of Grade or pure-bred stock		3,589 80	
5	Importation of pure-bred stock	11,000 00	8,707 54	2,292 46
6	Miscellaneous	334 76	332 85	1 91
	Totals	27,334 76	22,980 31	4,354 45

*Not yet adjusted.

BRITISH COLUMBIA.

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913, 1914 AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912 To Mar. 31.	1913 To Mar. 31.	1914 To Mar. 31.	1915 To Mar. 31.	1915-16 To Mar. 31. (Estimated)
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Salaries—Agricultural Branch, Dept. of Finance and Agriculture	30,061 06	37,851 78	53,755 12	67,288 62	72,428 00
Agricultural Associations	72,636 90	87,823 65	67,311 11	41,041 45	50,000 00
Board of Horticulture	2,247 20	2,556 65	1,078 25	217 70	500 00
Stock Breeders' Associations	1,618 64	4,633 42	2,717 68	1,278 04	
Flockmasters' Association	250 00	250 00	250 00	250 00	3,250 00
Dairymen's Association	2,249 61	3,062 51	2,999 55	2,096 46	3,000 00
Department of Agriculture—					
Grants to Students; Compensation for Cattle; Services and Expenses, outside; Miscellaneous, Weed Suppression	39,653 14	30,160 87	19,340 31	104,021 88	
			24,985 50		92,000 00
Panama Exposition					8,000 00
Fruit Work—					
Fruit Cooling and Storage		871 01	2,992 51		
Fruit Exhibitions	14,740 86	43,110 28	36,059 28		
Fruit Packing Schools		4,567 49	4,043 15	68,335 25	47,750 00
Inspection Nursery Stock		11,681 58	41,216 74		
Fruit Growers' Associations	2,657 00	4,211 42	6,251 66		
Demonstration Orchards	18,267 04	18,071 23	2,242 13		
Farmers' Institutes and Importation of Pure Bred Stock in 1913	11,427 30	58,577 05	17,575 75	7,704 60	27,500 00
Women's Institutes	3,613 02	4,640 01		4,993 85	
Poultry Association, Grant	3,372 21	2,934 64	3,870 86	1,879 91	7,000 00
Poultry Shows	2,500 00	3,100 00	4,000 00	4,000 00	
Totals	205,293 98	318,103 59	290,789 60	303,107 26	311,428 00

NOVA SCOTIA.

The subsidy provided under the Agricultural Instruction Act, in 1914-15, and its allotment:—

College maintenance	$ 20,000 00
Interest and sinking fund on chemistry and domestic science building ($70,000 at 20 years)	5,500 00
Agricultural education in Rural schools	9,000 00
Entomological and Horticultural investigation	7,000 00
Dairying (Educational work)	3,000 00
Poultry (Educational work)	1,500 00
Women's Institutes	3,000 00
Short courses	3,000 00
Field demonstration work	9,000 00
Contingencies	144 45
Total	$ 61,144 45

OUTLINE OF WORK PERFORMED.

College Buildings.—The department decided in 1914 to add a new building to the Agricultural College buildings at Truro to be devoted to chemistry and domestic science. Hitherto, students had been required to take certain lectures and do laboratory work at the Normal School, some distance from the college. The space available, and the times at which it could be secured, limited instruction and gave no opportunity for carrying on investigation work.

The new science building is 120 feet by 50 feet and contains three stories. The ground floor will be devoted to chemistry, the first floor to the laboratories of the Provincial Entomologist and Plant Pathologist, and the second floor to domestic science work. The building, when completed, will cost $110,000, which will be paid off from the Agricultural Instruction Act funds at a rate to clear the account in twenty years.

Agricultural Education in Rural Schools.—Under a director, the development of agricultural instruction in the rural schools has been marked. During the year ended July, 1914, 63 teachers and schools qualified for the grant at the Rural Science Training School. The schools represented were distributed through fifteen of the eighteen counties of the province.

Other schools have been stimulated by the gifts of seeds, bulbs, flowers, special fertilizers, by circulars of instruction for school and home gardens under school supervision, by the formation of clubs, school garden exhibitions, and by gifts of eggs of improved varieties of fowls to be raised by pupils. As soon as they can be trained, teachers with rural science diplomas will be employed in these schools.

In all these schools the pupils of the section have to make provision for the establishing of a school garden and its heavy work, and to provide a school library with some books referring to rural industries. The Provincial Government aids this work by giving from $5 to $10 to the teacher for acting as librarian, according as the library is up to the first or second standard, and provided the annual report is properly made out, and shows at least the prescribed circulation.

The Provincial Department provides entirely for the cost of training the teachers in the Normal College from September to June, and for the payment of their travelling expenses. After the close of the Normal at the end of June, these, together with Normal-trained teachers employed in the public schools, take up the vacation or summer courses which constitute the Rural Science Training School.

To enlarge the equipment of the Rural Science Training School originally provided by the province, about one thousand dollars' worth of microscopes, books and other apparatus were obtained, which will not have to be duplicated in subsequent years.

School Gardening and School Fairs.—In 1914 school fairs were for the first time definitely organized under the Rural Science movement, and the results were considered very satisfactory. Sixty schools exhibited at county fairs, and 13 of these held local fairs in addition. Eleven held local fairs only, making a total of 71 schools engaged in the work, including 1,277 children. The exhibits at local fairs numbered 3,134 and at county fairs 1,585.

In 1914 the Rural Science Department distributed about 20 bushels of seed potatoes, 12 bushels of seed oats, 110 settings of eggs and 15,000 strawberry plants to school children. The products of the first three items were prominent at exhibitions. It is hoped that in the fall the fairs will see products of the strawberry plants in the form of canned or preserved fruit prepared by school children.

In addition to the customary exhibits the children were encouraged to collect material illustrating local or provincial industries. At several of the fairs exhibits of vegetables and fruit were also made by the parents, but were not in competition with those made by the children. This increased the interest taken and the general appearance of the fair, and sometimes created a spirit of friendly rivalry between the children and parents.

The children's plots were inspected by the teachers who remained in the school section, and by a committee of local men, when the teachers did not remain. Where no prizes were offered for the plot, inspection was not followed.

Fairs were conducted at Heatherton, St. Andrews, St. Joseph and Georgeville in Antigonish County, and at Glendale, Cape Breton, by the local clergyman. These originated through an interest created by members of the Agricultural College staff who were doing extension work among the farmers of these districts. In Halifax and New Glasgow, the Women's Council held successful flower shows in connection with the schools.

In 1915 pupils were urged to buy their own seed. Where the teacher believed that outside assistance would really advance the work some assistance was given, as follows:—

Eggs, two to four settings to a school, total 300 settings; strawberry plants, 50 to a child, 200 to a school, total 6,000 plants. Potatoes, one-half bushel to a school, total 20 bushels. Oats, shrubs, seeds, etc., about $40 worth.

In addition to the foregoing, the Experimental Farm at Nappan sent a three-pound bag of potatoes to each rural science teacher. From the farm were also sent samples of oats, wheat and barley.

Horticultural and Entomological Investigations: Fifty per cent of the expenses of maintenance of the Entomology Department are drawn from the Dominion grant. The work undertaken by this department is of several kinds.

(*a*) Investigation: For the purpose of investigating injurious insects, two field laboratories are in operation, one at Truro and one at Kentville. As this is the first season that the department has undertaken such work on an extensive scale, it must necessarily be of a more or less preliminary character. The general plan, however, is to make a complete study of the various sucking insects which attack the apple and pear. Also the apple maggot, and a few vegetable insects, regarding which, information is urgently required at the present time. This season orchard aphids are being given particular attention.

Preparations are under way for making an exhaustive study of the life history, habits, methods of control, of the False Tarnished Plant Bug, Lygus invitus, which has been found to be a source of great loss to Annapolis Valley farmers. This work

will be carried on at the Kentville Station, which is the nearest one to the worst areas of infestation. The field stations are serving a very useful purpose as centres for distributing information regarding insect pests and plant diseases. This line of work has proven so promising that plans have been made to extend it at the expense of our general field inspection, which in some respects has served its purpose. For next year's work on the apple maggot, we have secured a small log cabin at Smith's Cove, Digby, which is to be fitted up as a laboratory for the study of this insect.

In order to have definite figures regarding the profits to be derived from spraying, a five years' lease has been taken of a small orchard near Bridgetown. One-half of this orchard is given the spraying demanded by good orchard practice, and the other is left untouched, the fruit is taken and marketed separately. Experiments in spraying along other lines are being arranged for.

(*b*) Inspection of Nursery Stock: All nursery stock entering Nova Scotia, passes through the provincial inspection stations at either Truro or Digby, where it is subjected to a thorough examination to determine whether or not it is infested with San José Scale or other injurious pests. In this way it has been possible to shut out a great deal of infested stock.

(*c*) General Field Inspection (summer work): During the past two years all parts of the province where fruit is grown commercially have been covered by the entomological inspectors, principally for the purpose of locating any cases of San José Scale that may have been imported previous to the inauguration of the inspection system. At the same time, the inspectors take the opportunity to point out to the farmers any cases of insect or fungus outbreaks which happen to come under their notice. In connection with this inspection they have also accomplished what is in effect, a very complete and accurate census of the fruit industry, and the information thus secured has been most useful in carrying on the work of the department. The San José Scale is now pretty well in hand and it is believed to be safe to cut down the amount of field inspection formerly required, concentrating the attention on further importations of infested stock.

(*d*) Brown Tail Moth Inspection (winter work): This work is under the supervision of the Dominion Entomologist and is carried on co-operatively by the Provincial and Dominion departments. It has been effective to the extent that this dreaded pest has done no appreciable damage in Nova Scotia.

(*e*) Plant Diseases: In the absence of a provincial plant pathologist the Entomological Department carries on a certain amount of field work along the line of plant diseases. The inspection for Powdery Scab of potatoes destined for export to Bermuda is done by the entomological inspectors, 15,000 barrels having been inspected in the fall of 1914.

A beginning has been made in the work of eliminating the degenerate potato stock, the planting of which has proven disastrous to Bermuda farmers and unprofitable to Nova Scotia potato growers.

(*f*) Teaching: The work of teaching zoology and entomology to the regular students of the Agricultural College, as well as at the short courses held throughout the province is included in the duties of the Provincial Entomologist.

Dairy Educational Work: The Superintendent of Dairying, Mr. W. A. McKay, like all other provincial officers, makes his headquarters at the College at Truro, where he gives instruction to the students. In addition to this he inspects the work carried on throughout the province and gives instruction to the makers at the creameries. He holds meetings and encourages the erection of creameries in suitable localities. The Federal grant provided for part of the salary and expenses of the director and also enabled him to secure an assistant.* Mr. George A. Clarke, who assisted in instruction at creameries and cheese factories, and who conducted a travelling library in Guysborough county.

* Succeeded by W. J. Bird

In 1914, three new creameries were started in Nova Scotia, making in all 24 cheese factories and creameries. These turned out 913,273 pounds of butter and 134,133 pounds of cheese. This amount will be increased during the season of 1915 by over 40 per cent.

Poultry Educational Work: A poultry branch is maintained at the Agricultural College under the direction of J. P. Landry, Superintendent, and grants are made to seven local poultry associations. These were financed by the province. In the year ending September 30, 1914, the amount thus expended was $2,059.85. When the Federal grant under the Agricultural Instruction Act became available, it was decided to extend the poultry instruction. $500 was set aside out of the appropriation for 1913-14 and $1,500 in 1914-15. This enabled the superintendent to hold meetings in various parts of the province and direct the organization of egg circles. Short poultry courses were held in 1914, at Yarmouth, Bridgewater, Shubenacadie and Middle Musquodoboit, and demonstrations in killing and dressing were given at seven other centres. A very important new line of work was the erection of demonstration poultry houses, on which the superintendent makes the following report:—

> "I have the pleasure of again placing on record my appreciation of the very generous manner in which the Poultry Department has been dealt with by the Federal Department of Agriculture. By the assistance of the grant received demonstration poultry houses were built in seven different parts of the province. An agreement was entered into in each case that the flocks were to be pure-bred fowl and eggs would be supplied to the farmers from these flocks. This method will assist to furnish pure-bred poultry in each section and will also furnish an example of the modern type of a poultry house. These demonstration houses were built at the following places: Eden Lake, Pictou county; River Denny's, Cape Breton; North Brookfield, Queens; Meteghan, Little Brook and Comeauville, Digby county, and Kempt, Queens county.
>
> These demonstration houses were located where from our experience most benefit would result to the farmers. In each case the demonstration houses were visited by a good number of persons and the interest in the construction was very marked. The houses were taken as a model and others were built in near neighbourhoods at the same time. It is to be hoped that we shall be able to continue this work in future and have others built in sections where better housing of poultry is much needed. A model poultry house stimulates the neighbourhood in which it is constructed in a remarkable manner to give better attention to their poultry."

Women's Institutes: During 1914, twenty-two institutes were organized, making a total of thirty-six, and these institutes are distributed through the various counties as follows: Pictou, three; Colchester, two; Cumberland, four; Hants, two; Kings, five; Annapolis, two; Yarmouth, two; Queens, three; Lunenburg, five; Antigonish, five; and Guysborough, three; leaving Halifax and Shelburne counties and Cape Breton Island still unorganized, not for lack of invitation or inclination, but for lack of time. It has been thought wiser in putting this movement on a working basis in Nova Scotia to have a few institutes organized in each county rather than have two or three counties thoroughly covered.

The second annual convention was held in January, 1915, during the second week of the annual short course. The first convention outranked the second one owing to the clashing of short course lectures and convention sessions. In future this will be avoided. The addresses at this convention sustained the high standard set at the first convention and were delivered by Honourable G. H. Murray, Premier of Nova Scotia; Mrs. John Stanfield, Truro; Mrs. Laura Rose Stephen, Huntingdon, Que.; Mrs. F. Sexton, Halifax; Principal Cumming, Mr. L. A. DeWolfe and Rev. W. P. Grant,

Truro. There were fifty-one delegates present and seven visiting members. The reports from the institutes were highly gratifying, particularly in regard to the amount of work accomplished for the Red Cross, Belgian Relief and Patriotic Fund. Besides their splendid response to these appeals, the institutes have not neglected the calls for aid in their own community. The membership runs between the minimum of fourteen and the maximum of fifty and the majority of institutes run closer to the maximum. The membership is composed of women of the best fibre in the province, women whose ideals are high and who stand staunchly for them, women whose desire is to better their homes and community and respond to the call "for home and country" at any moment.

At the first convention, a resolution was passed requesting the Government of Nova Scotia to consider the advisability of building, on the grounds of the Agricultural College, a domestic science school and residence for girls.

In response to this appeal there is to be devoted to the interests of women's work in the province the second floor of the new building being constructed on the college grounds. This will give the needed opportunity of developing the short courses and of providing adequate accommodation for future conventions.

The Women's Institutes have availed themselves of the travelling library of McGill University of Montreal. McGill University paid the transportation charges. The fee for the use of 25 to 30 books for three months was only about three dollars. The twelve institutes that have had the use of these books have found them exceedingly helpful.

A demonstrator and a lecturer on domestic science were in the field in the summer of 1914, and their efforts met with so much success that this phase of the work will be greatly developed, adding, if possible, demonstrators in other lines of homemaking and housekeeping.

"That the future of the institutes in Nova Scotia is a bright one is now an assured fact," states the superintendent, "and as the membership grows in numbers and strength, its influence for good will be from one end of Nova Scotia to the other, or as could easily be said in our beautiful sea-girt province, 'From the centre all round to the sea.'"

Short Courses: The short course at the Nova Scotia Agricultural College, held from January 5 to 15, 1915, was successful in every respect. The enrolled attendance in the men's course was 235, and in the women's course, 51, total 286. This is the third largest attendance in the history of the institution and the largest attendance ever recorded from the province of Nova Scotia. At the previous short courses there were always in attendance a large number of students, varying from 100 to 200 from the provinces of New Brunswick and Prince Edward Island, but as these provinces are now holding their own short courses, only a very few attended the Truro course.

The outstanding feature of the course was the opportunity given to those who attended to take up almost any line of study. Optional instruction was given in as many as four or five subjects at one time. In this way the large classes were in many cases reduced to smaller classes and much more effective work done than could be done by giving instruction continuously to classes too large for the attention of the teacher.

In addition to the usual features of stock-judging, seed-judging, and lectures in soil cultivation, some of the extra features included were a special course in manures and fertilizers, and a course of instruction in gasoline engines. The various gasoline engine firms sent engines to the college and a gasoline expert conducted the practical instruction classes.

Added features were instruction in special lines of dairying, veterinary science, poultry, horticulture, apiculture, entomology, and in fact almost every subject taken up in an agricultural college.

Even more successful, if possible, were the five short courses, each of three or four days' duration, held in March at Bridgewater, Yarmouth, Shubenacadie, Musquodoboit

and Antigonish. In each of these places the local Agricultural Society or similar organization made contribution of the necessary land and also part of the money. These, supplemented by funds provided under the Agricultural Instruction Act supplied the means necessary for the erection of demonstration buildings in which the courses were held. These demonstration buildings contain one or more large class-rooms capable of seating 300 or more students, and are well suited for demonstrations in live-stock judging, seed-judging, as well as lectures.

The lecturers, for the most part, were the senior members of the college staff at Truro, assisted by B. L. Emslie, Fertilizer Expert of Toronto, J. A. Clark, Superintendent Experimental Farm, Charlottetown, and others. The usual procedure was to hold in the mornings lectures and conferences on soil cultivation, manures and fertilizers, etc. In the afternoon, demonstrations in the judging of live stock and seed were held. In the evening, lectures on the care and management of live stock, soil cultivation, etc., were given. One evening at each course was devoted to the very important subject of "Patriotism and Production"; and without exception this was the largest meeting at each course. Locally-owned stock was used for demonstration purposes. Moreover a feature at every course was an informal conference on local agricultural problems which always proved most valuable. At the evening lectures lantern slides were used to a considerable extent for purposes of presenting pictures of the best types of live stock, barn construction, soil cultivation and drainage. The general average attendance at each session of the five courses, morning, afternoon and evening, was 147.

So successful have these short courses proven that the department would like to extend them through every part of the province. The difficulty, however, is to secure thoroughly efficient men, for without such men these courses would never attract the interest and arouse the enthusiasm they do. The college faculty was drawn on to about its limit. It would seem that in the future the agricultural staff must be increased in numbers, and no doubt this will be done as the country realizes the efficient work being accomplished through the short courses as well as through the many other lines of work now being carried on.

Note:—Courses of Domestic Science and Mechanic Science are provided in connection with the regular Normal College work, and as part of the Rural Science Training School in vacation time, July and August.

A Turnip Growing Contest: A portion of the grant received by the province of Nova Scotia in 1914, under the provisions of the Agricultural Instruction Act, was used to defray a portion of the expense in conducting a contest for farmers' boys in the growing of turnips. The contest was open to boys between the ages of fifteen and twenty years living in the counties of Colchester, Cumberland and Pictou, whose guardians' assessed valuation of property did not exceed $3,000. The area of turnips grown was one acre. Four prizes of seventy-five, fifty, thirty and twenty dollars were given in each county. The winners were allowed the option of spending the money: (1) In pursuit of an agricultural education; (2) for purchasing improved live stock; (3) for under-drainage or farm improvement; (4) in such other manner as may be agreed upon by the committee in charge of the contest. In addition to the regular prizes, the provincial Department of Agriculture contributed a prize of $5 each to the boys whose crops were almost equal to the four prize winners. Thirty boys competed, five in Cumberland, ten in Pictou and fifteen in Colchester. The yields of the first prize winners were as follows:—

	Bushels.
Cumberland	1,296
Colchester	1,266
Pictou	1,215

The average yield of field roots over Canada, according to the Canada Year Book, is about 360 bushels per acre. The contest is to be repeated in 1915.

SUMMARY FINANCIAL STATEMENT TO MARCH 31, 1915.

1913-14.. .. .. .

2.—College Buildings.—Continued.

Frank Wilson, contract	$ 5,358 26	
R. O. McCurdy, contract	4,254 00	
F. Dexter, plumbing	757 47	
		$ 14,379 13
Furniture and furnishings, Spencer Bros. and Turner		289 50
Materials, labour, etc.		207 79
Painting		114 49
Cementing		120 00
Angus McDonald, Inspector		94 50
Horticultural building		1,865 24
Interest account, Science building		625 44
Total		$ 13,686 09

Particulars of the 1912-13-14 expenditure on new college buildings were given in the Agricultural Instruction Act Report last year.

Of the 1914-15 grant of $5,500, $625.44 was paid as interest on the money borrowed by the province to cover cost of constructing the new science building, and $1,865.25 to cover balances on main and horticultural buildings. After interest charges on the science building have been met, the balance will be devoted to the sinking fund.

No. 3.—Agricultural Education in Rural Schools.

Grants, 1913-14, $6,700; 1914-15, $9,000	$ 15,700 00	
Expended to March 31, 1915		$ 14,873 13
Balance unexpended March 31, 1915		826 87
Total	$ 15,700 00	$ 15,700 00

L. A. DeWolfe, Director, Rural Education, salary, $2,000, expenses, $1,709.22	$ 3,709 22	
C. L. Moore, Dean of Rural Science school, salary, $1,000, expenses, $357.90	1,357 90	
J. A. Benoit, salary	100 00	
L. C. Harlow, salary	100 00	
F. G. Matthews, salary	100 00	
P. J. Shaw, salary	200 00	
B. H. Landels, salary	200 00	
W. H. Brittain, salary	100 00	
E. W. Connolly, salary	100 00	
H. W. Smith, salary	200 00	
R. Matheson, salary	100 00	
		$ 6,267 12
School Gardens—		
G. H. Higgins, services, $30, expenses, $20.75		50 75
School Exhibition prizes		69 50
Prize money		332 27
Teachers' grants		3,445 00
Students, travelling and expenses		1,906 55
Seeds, plants, fertilizers, etc.		468 03
Books, stationery, circulars, advertising		886 76
Microscopes, laboratory supplies and incidentals		1,447 15
Total		$ 14,873 13

This grant provides for the salaries and expenses of the Director of Rural Education and of the Dean of the Summer Science Schools; also salary of $100 each to instructors, (five in 1914) at the Summer School for Teachers, not including the director and dean. Approximately, $15 each is paid to teachers who take the course and make satisfactory progress. Teachers who secure diplomas receive additional grants varying from $30 to $90, the amount depending on their standing. Those who have taken part of the course may receive interim diplomas, and, if their work is satisfactory, may receive grants equal to about fifty per cent of the above. All of the money is not necessarily paid out of the Federal appropriation.

Other charges are for microscopes, laboratory supplies, and for seeds, plants and fertilizers for school or home gardens conducted by public school pupils and for settings of eggs for school fair work, printing and advertising.

No. 4.—Field Demonstrations.

Grants, 1913-14, $3,900; 1914-15, $9,000	$ 12,900 00	
Expended to March 31, 1915		$ 12,895 61
Balance unexpended March 31, 1915		4 39
Total	$ 12,900 00	$ 12,900 00
Services and Expenses—		
H. S. Cunningham	$ 2,228 78	
R. W. Donaldson	589 10	
P. L. Morse	305 95	
H. B. Langille	900 18	
W. M. Blair	431 95	
R. H. Brown	308 83	
L. D. Robinson	200 74	
J. G. Archibald	11 40	
L. Forsyth	183 46	
G. C. Atkinson	218 23	
C. S. Harland	125 00	
F. H. Johnson	21 77	
H. H. Blois	100 00	
Jas. McIntosh	29 25	
Hugh McPherson	278 99	
G. L. Lewis	76 66	
S. A. Cook	140 49	
T. Hodgson	68 50	
W. H. Woolworth	211 45	
W. B. Oulton	78 70	
C. H. Black	183 20	
H. R. Brown	126 35	
A. C. Tattrie	215 25	
P. L. Langford	62 70	
F. L. Fuller	103 59	
S. J. Moore	16 00	
P. A. Boving	311 85	
E. S. Leonard	175 28	
Guy Denton	173 27	
J. B. Joyce, wages and expenses	767 92	
Sundry persons, expenses	916 24	
		$ 9,560 82
Seeds, plants, fertilizers		994 81
Incidentals, freight, repairs		411 53
Equipment and Supplies—		
Tile machine and engine	$ 609 60	
Thermometers	230 26	
Orchard heaters	140 50	
Motor cycle	303 40	
Models	57 00	
Supplies	252 64	
		1,593 40
Tile making and laying		275 05
Field crop prizes		60 00
Total		$ 12,895 61

The work in this section consisted of:—

(*a*) The demonstration in field crops in plots of one acre, chiefly turnips, which in Nova Scotia form the basis of a satisfactory rotation with clover and cereals. Two men were employed throughout the growing season with the necessary assistants.

(*b*) Orchard demonstrations.

(*c*) Demonstrations with fertilizers and ground limestone.

(*d*) Demonstrations in the making and laying of drainage tile.

The charges against the appropriation include services and expenses of men employed, cost of tile machine and engine and its operation; thermometers and orchard heaters, motor-cycle supplies and field crop prizes.

5.—*Entomological and Horticultural Investigations.*

Grants, 1913-14, $8,500; 1914-15, $7,000	$ 15,500 00	
Expended to March 31, 1915	.....	$ 15,437 70
Balance unexpended March 31, 1915	.....	62 30
Total	$ 15,500 00	$ 15,500 00
Inspectors, services and expenses	$ 6,261 77	
R. Matheson, Professor of Zoology and Provincial Entomologist (1913-14), salary, $900, expenses, $306.87	1,206 87	
W. H. Brittain, Professor of Zoology and Provincial Entomologist (1915), salary and expenses	170 33	
V. T. Tarris, services	275 00	
C. B. Gooderham, services	25 00	
R. Bishop, services	14 40	
C. A. Good, Investigator, services and expenses	400 25	
A. Kelsall, services and expenses	60 13	
C. F. Collingwood, services and expenses	46 85	
V. Durling, services and expenses	14 87	
H. R. Brown, services and expenses	100 00	
W. H. Woodworth, services and expenses	78 00	
L. D. Robinson, services and expenses	19 20	
P. J. Shaw, expenses	47 77	
		$ 9,411 54
Greenhouse (construction)		2,308 79
Headhouse (construction)		2,454 29
Building material and labour		387 19
Entomological building		98 48
Architect's fees		114 00
Equipment, supplies and incidentals		663 41
Total		$ 15,437 70

The charges against this appropriation include half the salary and travelling expenses of the Provincial Entomologist and Professor of Zoology, the salary and expenses of his assistant, of the members of the field staff, and of the inspectors re San José Scale and Brown-tail Moth; motor-cycle, spraying equipment, supplies, etc.

The charges in connection with the entomological building and greenhouse were dealt with in the report of 1913-14.

6. *Dairy Educational Work.*

Grants, 1913-14, $3,000; 1914-15, $3,000	$ 6,000 00	
Expended to March 31, 1915	.....	$ 5,980 15
Balance unexpended March 31	.....	19 85
Total	$ 6,000 00	$ 6,000 00
W. A. McKay, Superintendent, half salary and expenses	$ 3,847 72	
Geo. A. Clark, salary and expenses	912 17	
J. R. Sutherland, salary and expenses	724 20	
C. F. Alward, salary and expenses	611 22	
H. Falconer	47 60	
F. L. Fuller	25 00	
C. H. Black	7 50	
L. C. Daigle	26 25	
M. D. McCharles	89 66	
Expenses	19 00	
		$ 5,710 56
Equipment		115 35
Delegates, annual convention expenses		63 80
Fees		40 00
Incidentals		50 44
Totals		$ 5,980 15

The charges made to this vote were explained in the report of 1913-14. The work was continued in 1914-15. It comprised inspection and instruction in cheese factories and creameries, creamery organization, educational meetings, etc.

7. *Poultry Work.*

Grants, 1913-14, $500; 1914-15, $1,500	$ 2,000 00	
Expended to March 31, 1915	.....	$ 1,991 53
Balance unexpended March 31	.....	8 47
Total	$ 2,000 00	$ 2,000 00

J. P. Landry, Poultry Superintendent, expenses	$ 888 94
Gathering eggs	188 47
Material, poultry house	359 23
Egg cases and coops	366 35
Delegates' expenses	30 20
W. H. Henry, services and expenses	10 95
Incidentals	147 39
Total	$ 1,991 53

To this division are charged the expenses of the poultry superintendent (salary charged to college), who is engaged in forming egg-circles, constructing model buildings, and demonstrating at exhibitions.

8. *Bulletins.*

Grant, 1913-14	$ 500 00	
Expended to March 31, 1915	.....	$ 500 00
Total	$ 500 00	$ 500 00

Printing and publishing Bulletins—	
L. C. Davidson & Co., catalogues and envelopes	$ 15 30
E. O. Cockayre, plates in colour	250 00
Weeks Printing Co., bulletins	152 00
The Advertiser, reports	76 37
Miscellaneous	6 33
Total	$ 500 00

9. *Fertilizer Demonstrations.*

Grant, 1913-14	$ 300 00	
Expended to March 31, 1915	.....	$ 300 00
Total	$ 300 00	$ 300 00

Materials and Freight—	
Sydney Cement Co., fertilizer	$ 144 45
Eastern Lime Co., pulverized limestone	120 00
I. C. Railway, freight	35 55
Total	$ 300 00

10. *Women's Institutes.*

Grants, 1913-14, $2,000; 1914-15, $3,000	$ 5,000 00	
Expended to March 31, 1915	.....	$ 3,787 96
Balance unexpended March 31, 1915	.....	1,212 04
Total	$ 5,000 00	$ 5,000 00

10.—Women's Institutes.—Continued.

Jennie A. Fraser, Superintendent, salary and expenses	$ 1,802 41	
Mrs. L. R. Steven, salary and expenses	324 35	
Grace E. Dutcher, " "	151 37	
M. J. Cox, " "	139 36	
Annie Redmond, " "	38 15	
Mrs. K. E. Hopkins, " "	7 20	
Mrs. A. E. Dunbrack, " "	117 55	
I. M. Baltzer, " "	25 95	
Miss S. Campbell, " "	183 10	
		$ 2,789 44
Delegates, expenses convention		404 44
Library fees, McGill		42 30
Handbooks, account books, printing, advertising, etc		231 17
Equipment, supplies, livery and incidentals		320 61
Total		$ 3,787 96

The salary and expenses of the superintendent are charged to this vote; cost of annual convention and the services and expenses of speakers at meetings; fees to McGill Travelling Library; cost of printing, advertising, equipment and supplies.

11. Short Courses.

Grants, 1913-14, $4,400; 1914-15, $3,000	$7,400 00	
Expended to March 31, 1915	.....	$6,890 22
Balance unexpended March 31, 1915	.....	509 78
Total	$7,400 00	$7,400 00

Grant to Agricultural Societies, etc., for buildings for short courses—		
Yarmouth	$ 750 00	
Shubenacadie	653 84	
Bridgewater	1,225 25	
Musquodoboit	600 00	
Antigonish	1,000 00	
		$4,229 09
Delegates, expenses		560 00
Equipment, materials and supplies		236 78
Advertising, printing, stationery		247 41
Heating, lighting etc.		158 69
Incidentals		47 49
Prof. M. Cumming, expenses	$ 49 40	
Prof. J. M. Trueman, expenses	92 21	
Prof. W. H. Brittain, expenses	14 00	
Jno. Standish, services and expenses	248 30	
B. H. Landels, services and expenses	274 98	
L. D. Robinson, services	24 35	
W. S. Blair, expenses	43 54	
W. D. Bowers, expenses	12 38	
H. S. Cunningham, expenses	286 65	
P. J. Shaw, expenses	31 57	
J. A. Sinclair, services and expenses	250 05	
D. H. McPherson	83 33	
		1,410 76
Total		$6,890 22

The expenditure made under this grant for buildings in which to hold winter short courses was dealt with in the report for 1913-14. Later, a building was provided at Antigonish, making five in all. The local agricultural societies provided part of the cost, which was about $1,500 for each building. The building at Antigonish provides quarters for the district representative. Heating, lighting, equipment, materials and supplies, advertising, services and expenses of instructors, expenses of members of the college staff, expenses of delegates, etc., are here charged.

12. *Orchards.*

Grant, 1913-14	$1,000 00	
Expended to March 31, 1915	.....	$1,000 00
Total	$1,000 00	$1,000 00
P. L. Morse, salary and expenses	$215 20	
L. D. Robinson, salary and expenses	269 75	
Jas. Allen, expenses	5 40	
P. J. Shaw, expenses	58 74	
		$ 549 09
Equipment		180 74
Materials		185 35
Printing reports		84 82
Total		$1,000 00

13. *Contingencies.*

Grants: 1913-14, $1,488.45; 1914-15, $144.45	$1,632 90	
Less transferred to College Buildings Account	1,195 41	
		$437 49
Expended to March 31, 1915		$302 79
Balance unexpended March 31, 1915		134 70
Total		$437 49
Limestone		$ 67 60
Freight		26 47
Scrapers		60 00
Printing reports		138 97
Royal Bank		9 75
Total		$302 79

STATEMENT AGRICULTURAL AID GRANT, 1912.

Section No.	Classification.	Grant.	Expended.
		$ cts.	$ cts.
1	Agricultural Societies	3,000 00	3,000 00
2	Agricultural College Buildings	31,288 45	31,288 45
	Total	34,288 45	34,288 45

1. *Agricultural Societies (Details):—*

Annapolis county	$ 361 06
Antigonish county	311 22
Cape Breton county	412 11
Colchester county	185 11
Cumberland county	96 40
Digby county	96 51
Guysborough county	164 08
Halifax county	5 25
Hants county	231 31
Inverness county	59 84
Kings county	236 00
Lunenburg county	303 66

1.—Agriculture Societies (Details).—Continued.

Pictou county	$ 218 87	
Queens county	47 44	
Richmond county	29 37	
Shelburne county	27 65	
Victoria county	71 62	
Yarmouth county	82 00	
Postmaster, postage	8 00	
Weeks Printing Co.	52 50	
		$ 3,000 00

2. Agricultural College Buildings (Details):—

Frank Wilson, contract and extras		$ 20,790 38
R. O. McCurdy, on account contract		5,000 00
A. R. Cobb, architect's fees, etc.		1,240 04
Dexter and Co., plumbing		121 10
Furniture and Furnishings—		
Spencer Bros. & Turner	$ 1,408 88	
Vernon & Co.	615 60	
Crowe Bros.	146 40	
Incidentals	38 60	
		$ 2,209 48
Angus McDonald, inspector		626 50
Materials, labour, etc.		1,300 95
Total		$ 31,288 45

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913, 1914, AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912 to Sept. 30.	1913 to Sept. 30.	1914 to Sept. 30.	1915 to Sept. 30. Estimated.
	$ cts.	$ cts.	$ cts.	$ cts.
General Agriculture—				
Dept. Salaries and Expenses	6,718 79	7,672 08	5,449 77	
Assistance in Dairying	835 62	926 16	1,257 34	
Entomological Inspection	4,544 85	3,582 27	2,744 15	
Drainage	2,395 92	1,534 01	903 19	
Exhibitions	11,588 05	12,457 84	18,222 13	
Field Crop Competitions	298 50	870 18	939 18	34,750 00
Live Stock Improvement	1,520 55	898 57		
Meetings	445 55	621 84	69 77	
Model Orchards	910 66	983 31	832 15	
Printing and Advertising	204 26	134 35	306 81	
Miscellaneous	3,322 46	397 06	228 20	
Agricultural College	19,773 54	19,607 25	22,000 00	33,000 00
College Farm	13,113 11	14,317 41	14,000 00	
Agricultural Societies	10,314 85	13,282 32	15,787 05	15,000 00
Fruit Growers and County Associations		1,032 75	1,150 00	
Stallion Enrolment		84 75	518 91	
Assistance to Poultry		100 35	565 13	
Totals	75,986 71	78,502 50	84,973 78	82,750 00
Revenue	6,463 32	9,498 41	6,677 26	8,500 00
	69,523 39	69,004 09	78,296 52	74,250 00

NEW BRUNSWICK.

Work of the Provincial Department of Agriculture.

The work carried on under the Federal grant is supplemental to that financed by the provincial appropriations. The leading features of this latter are:—

(1) Stimulation of the live stock industry: The necessity for more and better live stock being apparently one of the greatest needs. The growth of alfalfa and early varieties of fodder corn are being encouraged, and pure-bred live stock is being introduced by the Provincial Department.

(2) Dairying and Poultry: Work in connection with the dairy industry is regarded as one of the most important activities of the department's work. In addition to the instruction given in the dairy schools and in the agricultural schools, testing and recording centres are being established.

(3) Fertilizers: In the matter of commercial fertilizers New Brunswick consumes more than all the rest of Canada. The farmers are being instructed to mix their own raw materials. A purchasing agency, known as the Agricultural Societies United was organized in 1914 to deal in fertilizers, and handled large orders at a great saving to the farmers. A limestone crusher is operated and is sent wherever required and the work is done at actual cost.

(4) Standing Field Crop Competitions: The object of these competitions is to improve the quality of the seeds. Seed competitions are held and also a seed fair at Fredericton. Two-thirds of the prize money is paid by the Dominion Seed Branch, and the balance out of provincial funds.

(5) Horticulture: Demonstration and illustration orchards are conducted by the province. In the former, the department takes over the supervision of old orchards, and shows how they can be improved by proper treatment and care. The illustration orchards were planted by the department, and are to be looked after for ten years.

(6) The Entomological Branch: The Provincial Entomologist visits the schools and gives instruction in regard to insect life, teaching the children to discriminate between insects and birds that are beneficial and those that are destructive to crops. The extermination of the Brown-tail Moth, and other pests is dealt with.

The Agricultural Instruction Act.

The subsidy provided under the Agricultural Instruction Act in 1914-15 and its allotment:

Building, equipment and maintenance of agricultural schools	$12,500 00
Equipment and maintenance of dairy schools	3,451 69
Short courses in agricultural work	1,500 00
Provincial officers to inspect and instruct in agricultural work	2,000 00
Director of elementary agricultural education	2,500 00
Transportation of agricultural students	1,500 00
Courses in training for teachers	1,748 31
Travelling instructors	13,000 00
Women's Institutes	3,000 00
Drainage and soil cultivation	2,000 00
Demonstration trains	1,000 00
School gardens	3,500 00
Bulletins	500 00
Contingencies for the carrying on of any of the above services	1,207 20
Total	$49,407 20

SESSIONAL PAPER No. 15c

OUTLINE OF WORK PERFORMED.

Agricultural Schools: The spring of 1915 witnessed the completion at Sussex of the second of New Brunswick's Agricultural Schools. The first of these schools was completed at Woodstock one year previously. No effort is being spared to equip them with everything necessary for effective agricultural instruction. Though not so large as the Woodstock school, the accommodation will be fully as great, since the whole of the building will be used for agricultural work, and considerable additional accommodation is available in the dairy school, which stands alongside. A six-weeks' course in agriculture was held in each school in the spring of 1915.

The school at Sussex was formally opened and dedicated on July 15, 1915. The Hon. J. A. Murray, Minister of Agriculture, presided, and had on the platform with him, His Honour Lieutenant Governor Wood, Premier Hon. Geo. J. Clark, Provincial Secretary-Treasurer, Hon. Dr. D. V. Landry, Attorney General, Hon. J. B. M. Baxter, the Mayor of Sussex and other officials, educational and agricultural. One hundred and fifty school teachers and school inspectors were in the audience, they having come primarily to spend four weeks at the Summer School of Science, which opened in the new building on July 14.

The Provincial Minister of Agriculture gave credit to the Dominion Government for the assistance given towards the cost of the schools.

The new building, about 44 by 79 feet in size, presents a very creditable and attractive appearance, and contains a number of very fine rooms suitable for the various branches of work. The first floor has an office, a cloak room, and an assembly room 40 by 50 feet, which will also be used for seed-judging work. The second floor has two large rooms, one of which will be used as a general laboratory and the other as a lecture room; each has a preparation room attached. In the basement a live stock judging room, 40 by 43 feet, will be equipped with seats built in tiers on two sides of the room.

Dairy Schools: Two dairy courses are provided, one at the dairy school in Sussex and the other at St. Hilare, Madawaska County. The latter, which was referred to in the report of 1913-14, is more particularly for the French-speaking section of the province.

Elementary Agricultural Instruction: The expenditure for this purpose is under the control of the Minister of Agriculture. The officer administering the work, while appointed by the Minister of Agriculture, is given authority by the Schools Act in the public schools carried on by the Board of Education.

The Board of Education has prescribed a course of instruction in nature study and agriculture for use in all the schools, and outdoor education is now being employed as a feature of general school work. In order to qualify the teachers, a rural science school was opened at Woodstock in the summer of 1914. Instruction in school gardening, nature study, and the fundamental principles of the natural sciences is given, together with the best methods of awakening interest among the people and of correlating such work with the other subjects of the school course. Seventy-five teachers and inspectors attended. Interest and enthusiasm were marked, and the departments have reason to be well satisfied with the work accomplished in the first session of the school. It is the intention to provide two courses in 1915, one at Woodstock, and another at Sussex. A sufficient number of teachers applied to fill both the schools.

School Gardens: Forty-eight school gardens were in operation in the last term of 1914, under the supervision of specially trained teachers. In addition, 89 home plots were carried on. Pupils undertaking the latter were required to keep records of their work, and the plots were inspected by the teachers. Of the 47,760 pupils in the country schools, 2,502 received special instruction in this department of work. Seeds, bulbs, and shrubs were given to the children, and it is likely that in the future settings of eggs may be added.

Short Courses: The programme of courses as carried out was as follows:

Newcastle, N.B.: Four days' course (general), December 1-4, 1914.

Woodstock Agricultural School—Six weeks' course (general), January 5-February 12, 1915; and a four days' course (general), February 9-12, 1915.

Sussex Agricultural School—Two weeks' course in Dairying, Horticulture, Poultry and Bee-keeping, March 2-3, 1915.

Two weeks' course in Live Stock, Field Crops and Soil Management, March 15-27, 1915.

Three days' course (general), March 25-27, 1915.

The work at Sussex, it will be noted, was divided into two consecutive courses of two weeks each, and students had the option of taking one or both courses. It was hoped in this way to encourage a larger total attendance than could be secured by a single general course four weeks in length. However, there was little apparent effect in this direction, and the results on the whole are in favour of a longer general course; the students do decidedly better work and acquire to a greater extent the "student spirit"—the spirit of investigation and inquiry which leads them to make better use of their opportunities.

A number of new features were introduced into the courses this year, some with a view to furthering various lines of work that have been undertaken recently by the Department of Agriculture for the benefit of the farming community. In connection with the drainage campaign being carried on, one of the most serious problems has been to secure a sufficient supply of tiles at reasonable cost. At each course this winter a demonstration was given in the home making of cement tiles. Instruction was given in the proper method of mixing fertilizers. As a part of the fertilizer work there was included a discussion of the function of lime in the soil. Samples of pulverized limestone crushed by the department's machine were submitted and the value and uses of this material were explained fully. Demonstrations in the killing and plucking of poultry, in the proper use of the fanning-mill for grading seed grain, and in the treatment of grain for smut were, along with those mentioned above, included among the newer features of the three and four days' courses.

During the longer courses two new and interesting lines of work were taken up. These were an experiment conducted by the students in the crate-fattening of poultry, and a study of grain samples supplied by the students from seed intended for use on their home farms in 1915.

For the study of grain samples a working model was used of a fanning-mill commonly in use throughout the country. Its dimensions are 22 inches long, 18 inches wide, and 22 inches high. This does the work almost as well as a full sized mill, and is much more convenient for class-room purposes, especially when working with small quantities. The instructor in field crops had the students handpick a pound of the grain as it came from the farm, to find the percentage of large plump seed. Other portions were put through the fanning mill one, two, and three times, and the product subjected to the test of handpicking. This work brought out strikingly the quality of the seed grain in common use, as well as the value of the fanning mill for both grading the grain and removing the weeds. The instructor in biology had the students make exact determinations of the percentage of weed seeds, and followed this with a study in identification and methods of control. The samples were also examined carefully for smut, ergot, and other diseases.

The method of presentation in the three and four days' courses were confined very largely to making practical demonstrations, with explanatory lectures. The remaining lectures were illustrated in almost every case by lantern slides. It has been found advisable that talk, unaccompanied by demonstration or the use of illustration material, should be reduced to a minimum.

In the longer courses half the time was devoted to laboratory work, and the periods were made as practical as possible. Practice for every student in Babcock milk-testing

and in butter-making was provided as part of the course in dairying. For pruning and grafting of apple-trees, visits were paid to nearby orchards, and good-sized trees were also brought into the class-room. For stock-judging work, good representatives of the leading breeds were brought into the class-room; also, the members of the class visited the stables of some of the leading breeders of the neighbourhood. Advantage was taken of these visits to make a practical study of building construction and ventilation systems.

A bulletin reading course prescribed for the students at the longer courses is a feature worthy of note. Copies of one or two of the best bulletins obtainable, bearing upon each subject of study, were provided in sufficient number so that a complete set could be loaned to each student at the beginning of the course.

Household Science: So successful was the short course in Household Science held at Sussex during the winter of 1913-14, for the benefit of the women of rural districts, that the Department of Agriculture felt encouraged to hold three courses during the winter of 1914-15, taking up the following subjects:

Cooking, theory and practice; composition of foods and food values; a short course in waitress' work; hygiene and sanitation; home nursing; sewing; house-planning and interior decoration.

Two of these courses, held in the agricultural schools at Woodstock and Sussex, January 5 to 16, and February 16 to 27, respectively, were held in conjunction with the agricultural courses, and were so arranged that students could take advantage of lectures on dairying, poultry-raising and horticulture. The other course was held in the high school at Chatham, January 26 to February 6. The courses were so simplified that, combining practice with theory, the knowledge gained thereby could be applied to daily living.

The following report of the work in Domestic Science has been furnished and is given somewhat in detail, as it furnishes a fairly complete account of the nature of the instruction provided:

"The cooking, house-planning, interior decoration, and sewing classes, were in charge of Miss Imogene Jonah, of Sussex, a household science graduate. Each day students were given an opportunity to prepare and serve a meal where the family income, cost of food, sanitary cooking and nutritive value were considered. Attention was paid to the selection of supplies from an economic and useful standpoint, thereby developing an interest in marketing and accounts. Upon different occasions, enthusiastic students visited the butcher shops of the town to become familiar with prices and cuts of meat. A very practical demonstration was given by one of the butchers, when he cut several quarters of beef, veal, and pork, allowing the students to handle and become familiar with the various cuts.

The lectures on planning, decoration and care of the house, proved interesting and instructive. Attention was given to the most desirable location for a house, when treatment of soil and proper drainage need to be considered before building, and in order to have a comfortable home, heat, light, water, ventilation and sunshine must be thought of. From day to day lectures on treatment of floors, walls and ceiling decorations, bed-room and living-room conveniences, the proper equipment of the kitchen, etc., led to discussion on the transformation of old houses, the modernization of the farmhouse, and intelligent furnishing when beauty of simplicity should be considered.

The sewing class occupied two hours each day and included lessons in cutting, fitting and embroidery. Many pupils at the beginning of the course knew absolutely nothing about sewing, but before the course had finished were able to cut out and make plain shirt-waists, skirts, night-dresses, kimonas, etc. At the close of each course, articles completed were exhibited.

The hygiene, sanitation and home-nursing classes were conducted by Miss Hattie Brown, of Fredericton, a graduate nurse. The lectures on hygiene included, heredi-

tary diseases, baths, care of the hair, teeth, nails, and feet, habits, occupation, exercise and rest, clothing, location of the home and out-buildings, water supply, sinks, sewers and cesspools, care of garbage and disposal of same, and general cleanliness in the home.

Lectures, followed by practical demonstrations, made up the home-nursing class and included: Location and furnishing of the sick-room, ventilation and temperature, beds and bed-making, changing of bed linen with the patient in bed, changing or turning mattress with the patient in bed, getting patient up out of bed for the first time, bodily comfort of patient, different kinds of baths, different methods of taking patient's temperature, counting pulse and respiration, care of typhoid patient, disinfection of bed linen and excreta; the making of poultices, mustard plaster, fomentations and their application, bandages and bandaging, the application of splints, fracture boxes, artificial respiration, the keeping of charts and notes for the doctor.

A lecture was given on contagious diseases and the care of the patient during sickness, convalescence or death.

The emergency nursing treated of fractures, dislocations, sprains, foreign bodies in the eye, ear, nose and throat, sunstroke, fainting, hysteria, asphyxiation, intoxication, convulsions, shock, common poisons, their antidotes and treatment, burns and scalds produced by acids and alkalies, drowning, frost bites, fire.

The short courses this winter, differed from last in that they were held for the benefit of women's institute members only, and the Department being anxious to give all students an opportunity for individual work, only 40 applications were considered for each separate course. Owing to this, several applicants were turned away, but these courses have become so popular it is very probable the number will be doubled next winter.

Women's Institutes: There are institutes in every county in the province with the exception of Madawaska and Gloucester, the number having increased from 28 at the close of 1912 to 62, with a membership of 2,000, in the spring of 1915.

The following is the number of active institutes by counties:—Albert, 3; Carleton, 7; Charlotte, 5; Kent, 3; St. John, 2; Sunbury, 3; Victoria, 4; Westmorland, 5; Northumberland, 5; Kings, 10; Queens, 4; Restigouche, 2; York, 7.

The organizers report a very large attendance at nearly all the public meetings, and much enthusiasm. A well-known school inspector spoke in decided terms of approval concerning the various improvements in the country schools brought about through the efforts of the institutes.

The members did their part to help in the great world-war, having raised $5,000 in cash and supplied great quantities of material for Red Cross work and soldier's comforts.

Miss Hazel E. Winter is supervisor of Women's Institutes and Miss Imogene Jonah is instructor in Domestic Science.

Travelling Instructors: The work of the travelling instructors is one of the most important being carried on. The staff comprises the Dairy Superintendent, the Horticulturists, the Poultry Superintendent, Animal Husbandman, Bee-keeping Instructor, Fertilizer Instructor, the teachers in the Agricultural Schools, and men engaged from time to time for special subjects. The instructors not only attend meetings and give instruction by means of lectures, but they visit each farmer's place in turn and demonstrate methods in a practical way. The appreciation being met with is highly gratifying.

Demonstration Trains.—During the past two years all the territory in the province traversed by the Canadian Pacific and the Intercolonial railways has been covered, and the work will hereafter be discontinued. The good results that have come from carrying agricultural education to the farmers in this way are generally admitted.

Drainage and Soil Cultivation.—This is the second year of operation for the ditching machine operated for the purpose of demonstrating the good results that come from proper drainage. The farmer on whose land the work is done pays the actual cost of operation, the other expenses being met out of the appropriation. Replies received from farmers in various parts of the province testify that the introduction of drainage is bringing about increased productiveness, and not only adding to the length of the season, but making it possible to work the soil more easily and cheaply and with better results.

The deficiency of lime in New Brunswick soils is serious enough to constitute an important problem. Since pulverized limestone has been found as effective as burnt lime, as well as a cheaper and more advantageous form to use, and limestone deposits are widely distributed over the province, the department purchased a first-class portable pulverizer and demonstrated the production of this material. The work was carried on in co-operation with agricultural societies or groups of farmers, who quarry the limestone and prepare it for the machine. Experiments are already under way to show the effect of applications of limestone to the soil, both alone and in conjunction with barnyard manure and commercial fertilizers. In this work, as in the drainage work, meetings are held in connection with the demonstrations dealing with the whole question of soil fertility.

SUMMARY FINANCIAL STATEMENT FEDERAL SUBSIDIES OF 1913-14 AND 1914-15 TO MARCH 31, 1915.

1913-14	$44,509.93
1914-15	49,407.20

Section No.	Classification.	Grants 1913–14 1914–15.	Expended to Mar. 31, 1915.	Balance Unexpended Mar. 31, 1915.
		$ cts.	$ cts.	$ cts.
1	Agricultural Schools	18,500 00	24,878 65	
2	Dairy Schools	5,451 69	5,869 20	
3	Short Courses	2,500 00	1,951 10	548 90
4	Provincial Officers, Instructors	4,000 00	5,028 61	
5	Director Elementary Agricultural Education	4,000 00	3,287 51	712 49
6	Courses of Training for Teachers	2,248 31	2,464 71	
7	Transportation Agric. Students	1,500 00	1,227 82	272 18
8	Bulletins	2,000 00	2,109 58	
9	Travelling Instructors	27,200 00	25,628 30	1,571 70
10	Women's Institutes	5,000 00	4,723 72	276 28
11	Instruction in Domestic Science	200 00	44 40	155 60
12	Training Teachers Domestic Science	200 00	22 20	177 80
13	Demonstration Trains	3,400 00	3,398 86	1 14
14	Drainage and Soil Cultivation	6,500 00	6,991 79	
15	Bee-keeping	500 00	170 56	329 44
16	Teachers in Agricultural Schools	4,000 00	3,918 60	81 40
17	School Gardens	5,000 00	3,582 22	1,417 78
18	Contingencies	1,717 13	940 73	776 40
	Totals	93,917 13	96,238 56	6,321 11

Sections 1, 2, 4, 6, 8, 14 Over-expended balances.....$8,642 54

The over-expenditures have been met out of the grant for 1915-16, and the balances on hand were carried forward and have been expended since March 31. These will be accounted for in the report for 1915-16.

DETAILS OF EXPENDITURE, APRIL 1, 1913, TO MARCH 31, 1915.

1.—Agricultural Schools.

Grants: 1913-14, $6,000; 1914-15, $12,500	$18,500 00	
Expended to March 31, 1915	.....	$24,878 65
Balance overexpended March 31, 1915	6,378 65	
Total	$24,878 65	$24,878 65
Buildings—		
Contracts, W. F. Lutz	$17,468 00	
G. E. Fairweather, architect	500 00	
Incidentals	639 11	
		$18,607 11
Equipment, furniture and furnishings		3,913 12
Maintenance—		
Miscellaneous	$671 80	
Fuel and light	372 19	
Insurance	680 00	
Janitor's services	634 43	
		2,358 42
Total		$24,878 65

To this appropriation is charged the building cost of the new Agricultural School at Sussex, and the cost of furniture, furnishings, equipment and maintenance of the school at Woodstock built with the funds from the Fisher bequest.

The cost of the Sussex school was nearly $28,500. The cost of equipment with extras will be nearly $33,000. Of this amount $18,607.11 has been charged, and the balance will be provided in succeeding years. This plan of spreading the cost of buildings over more than one year is followed at the Agricultural College, Truro, N.S., and at the two French schools of agriculture in Quebec, arrangements being made locally to finance the whole cost of construction. (See report 1913-14, pp. 47-48.)

2.—Dairy Schools.

Grants: 1913-14, $2,000; 1914-15, $3,451.69	$5,451 69	
Expended to March 31, 1915	.....	$5,869 20
Balance overexpended March 31, 1915	417 51	
Total	$5,869 20	$5,869 20
W. E. Lutz, labour and materials, Sussex school	$1,334 75	
Equipment and furnishings	3,958 63	
		$5,293 38
Maintenance		575 82
Total		$5,869 20

The expenditure includes part cost of construction of the Dairy School at Sussex, and the cost of equipment, furnishings and maintenance of both the Sussex and St. Hilaire schools. The Dairy School at St. Hilaire, Madawaska County, was put into operation recently and is proving of great benefit to the people of the district. The organization of these two schools was dealt with in the report for 1913-14, pp. 49 and 50.

3.—Short Courses.

Grants, 1913-14, $1,000, and 1914-15, $1,500	$2,500 00	
Expended to March 31, 1915	.....	$1,951 10
Balance unexpended March 31, 1915		[illegible]
Total	$2,500 00	$2,500 00

3.—Short Courses.—Continued.

Instructors, lecturers, judges, etc.—		
R. A. Philmore, services and expenses	$ 62 95	
O. W. Wetmore, " "	23 20	
P. A. Boving, " "	129 45	
Andrew Elliott, " "	162 95	
B. Robertson, " "	27 20	
John Woods, " "	11 40	
H. Barton, " "	37 85	
Sundry persons, judging expenses	357 10	
" seed fair expenses	95 30	
		$ 897 40
Supplies, live stock and transportation of same		366 95
Incidentals		217 78
Advertising and printing		423 67
Transportation of delegates		45 30
Total		$1,951 10

The services and expenses of the instructors and lecturers at the Short Courses held at Newcastle, Woodstock and Sussex; the cost of getting together specimens of live stock and other illustrative objects, advertising, printing and supplies are here charged.

4.—Provincial Instructions and Inspectors.

Grants, 1913-14, $2,000; 1914-15, $2,000	$ 4,000 00	
Expended to March 31, 1915		$ 5,028 61
Balance overexpended March 31, 1915	1,028 61	—
Total	$ 5,028 61	$ 5,028 61

	Salaries.	Expenses.
J. E. DeGrace, Supt. Agricultural Societies	$ 770 84	$ 486 02
Andrew Elliott, judging, services	210 00	165 15
C. A. Voye, potato inspector	67 16	150 70
L. F. Webster, potato diseases	112 28	147 96
Wm. Kerr, potato diseases and judging	514 00	437 19
Amos Downey, potato diseases	98 00	62 80
Wm. Stevens, potato diseases	54 00	59 20
R. Rideout, "	58 00	57 90
H. F. Turney, "	72 76	133 80
F. L. Fox, "	68 04	130 25
J. Christian, "	62 00	29 35
A. R. Sipprelle, potato disease and inspecting	76 00	50 45
Ward Ginson, " "	74 00	52 25
G. H. Williams, " "	44 00	21 10
L. A. Slipp	172 50	82 65
C. E. Sheridan	156 66	193 60
Total	$ 2,610 24	$ 2,260 37
		$ 4,870 61
Incidentals		158 00
Total		$ 5,028 61

These officers travelled about the province giving instruction to the farmers. A large share of their attention was given to the potato crop and their work was of great advantage to the community. The expenditure covers salaries and expenses during the two years.

5.—Director Elementary Agricultural Education.

Grants, 1913-14, $1,500; 1914-15, $2,500	$ 4,000 00	
Expended to March 31, 1915	.....	$ 3,287 51
Balance unexpended March 31, 1915	.....	712 49
Total	$ 4,000 00	$ 4,000 00
R. P. Steeves, Director salary		$ 2,199 99
" " expenses		614 64
Office expenses		250 78
Furniture		151 20
Printing		70 90
Total		$ 3,287 51

The expenditure covers the salary and office expense of the Director, Mr. R. P. Steeves, B.A., since his appointment in August, 1913. The scope of the work carried on by the director was fully set forth in the report for 1913-14 pages 50-52, and is also dealt with in this report.

6.—Courses for Training Teachers.

Grants, 1913-14, $500 and 1914-15, $1,748.31	$ 2,248 31	
Expended to March 31, 1915	.....	$ 2,464 71
Balance overexpended March 31, 1915	216 40	—
Total	$ 2,464 71	$ 2,464 71
Instructors—		
H. H. Hagerman, services	$ 225 00	
D. W. Hamilton, "	100 00	
H. B. Bigelow, "	100 00	
Horace G. Perry, "	125 00	
Jas. A. Starrat, "	125 00	
J. E. McLarty, "	125 00	
J. E. McLarty, expenses	45 00	
Jean Peacock, services	100 00	
		$ 945 00
Supplies, etc		239 21
Teachers' expenses		415 50
Allowances, sundry persons for attendance at summer school, Woodstock		245 00
Bonuses for attendance at summer school, 31 at $20		620 00
Total		$ 2,464 71

The appropriation covers the services of instructors at the Rural Science School for teachers at Woodstock, teachers' expense allowance, and bonuses. Every teacher who passed the examination in Agriculture with School Gardening, previous to entering the course, and who made satisfactory progress during the course, received in addition to travelling expenses, $20 for living expenses while at Woodstock. The main items of expenditure were as follows: Instructors, $945; teachers' allowances and expenses, $660.50; bonuses, $620.

7.—Transportation of Students.

Grants, 1914-15	$ 1,500 00	
Expended to March 31, 1915	.....	$ 1,227 82
Balance unexpended March 31, 1915	.....	272 18
Total	$ 1,500 00	$ 1,500 00
Railway fares of students		$ 1,227 82

Hitherto it has been the practice of the province to pay the transportation expenses of students to the short courses at the Agricultural College, Truro, N.S., but now that the province has its own agricultural schools, at which the short courses are to be held, no more transportation expense will be incurred for short courses. The department will continue paying transportation for students who are taking the full course at any agricultural college in Canada.

8.—Bulletins.

Grants, 1913-14, $1,500; 1914-15, $500	$ 2,000 00	
Expended to March 31, 1915	.....	$ 2,109 58
Balance overexpended March 31, 1915	109 58	—
Total	$ 2,109 58	$ 2,109 58
Preparation and printing, bulletins and pamphlets	$ 1,702 30	
Maritime Farmer, 5091, 4 months subs. for members of Agricultural Societies	407 28	
		$ 2,109 58

Details of the expenditure for Bulletins will be found in the report of 1913-14, page 51. The balance of the expenditure covered four months' subscription to *The Maritime Farmer* for 5,091 members of agricultural societies.

9.—Travelling Instructors.

Grants, 1913-14, $14,250; 1914-15, $13,000	$ 27,200 00	
Expended to March 31, 1915	.....	$ 25,628 30
Balance unexpended March 31, 1915	.....	1,571 70
Total	$ 27,200 00	$ 27,200 00

	Salaries.	Expenses.	
L. C. D'Aigle, dairy supt	$ 1,750 00	$ 964 43	
C. W. McDougall, dairy supt	1,750 00	472 35	
N. W. Eveleigh, asst. dairy supt	2,116 65	904 36	
R. P. Gorham, asst. hort	2,158 32	638 05	
D. B. Flewelling, asst. hort	1,708 32	830 34	
H. B. Durost, instructor bee-keeping	1,620 80	1,025 00	
Seth Jones, instructor poultry	1,816 64	805 08	
A. S. Turney, horticulturist	1,950 00	255 54	
W. D. Ford, asst. animal husbandry	1,222 84	412 20	
W. McIntosh, Prov. Entomologist	1,150 00	—	
			$ 23,550 42
Amos Downey, poultry, service and expenses		$ 440 75	
D. B. Holman, horticulture, service and expenses		451 91	
John Woods, " "		88 95	
A. C. Parker, " "		22 85	
P. N. Vroom, " "		523 77	
H. F. Turney, " "		40 15	
Stenographic assistance		364 00	
			$ 1,932 38
Wagon, sleigh, harness			105 00
Incidentals, boarding horse			40 00
Total			$ 25,628 30

This grant was expended for salaries and expenses of officers of the department and others who carried on instruction and demonstration work among the farmers in connection with the work of the various branches, details of which will be found in the 1913-14 report. This statement covers the salaries and expenses of practically the entire field staff of the provincial department, sixteen in all, in dairying, horticulture, live stock, poultry, bee-keeping, and entomology.

10.—Women's Institutes.

Grants, 1913-14, $2,000; 1914-15, $3,000	$ 5,000 00	
Expended to March 31, 1915	.....	$ 4,723 72
Balance unexpended March 31, 1915	.....	276 28
Total	$ 5,000 00	$ 5,000 00

Hazel E. Winter, supervisor, salary	$ 970 80	
Hazel E. Winter, expenses	791 58	
Imogene Jonah, instructor in domestic science, salary	482 50	
Imogene Jonah, expenses	84 11	
Lena A. McLean, adv. agent, salary	170 00	
Lena A. McLean, expenses	246 86	
Lecturers, organizers, etc., sundry persons, services and expenses	360 10	
		$ 3,105 95
Supplies, etc		233 40
Advertising and printing		95 72
Incidentals		155 81
Delegates, convention expenses		183 55
Library books for institutes		464 29
Women's Institute grants ($5)		485 00
Total		$ 4,723 72

The expenditure covers the salaries and expenses of the Supervisor and the Instructor in Domestic Science, and of lecturers, organizers, etc. Also grants to Institutes ($5 to each), Institute library books, convention expenses, supplies and incidentals.

13.—Demonstration Trains.

Grants, 1913-14, $2,400; 1914-15, $1,000	$ 3,400 00	
Expended to March 31, 1915	.....	$ 3,398 86
Balance unexpended March 31, 1915	.....	1 14
Total	$ 3,400 00	$ 3,400 00

	Services.	Expenses.	
C. D. Macintosh	$ 3 00	$ 17 00	
A. Downey	187 00	19 00	
F. Forsyth	108 00	32 95	
R. Newton	....	373 15	
E. C. Rice	65 33	111 80	
J. F. Roach	98 00	9 25	
	$ 461 33	$ 563 15	
			$ 1,024 48
Advertising and printing			703 47
Supplies, furnishings, hire of live stock			1,169 78
Incidentals			117 46
Board			383 67
Total			$ 3,398 86

The services and expenses of the Travelling Instructors who accompanied the trains were charged under this head: also supplies, furnishings, hire of live stock, advertising, etc.

14.—Drainage and Soil Cultivation.

Grants, 1913-14, $4,500; 1914-15, $2,000	$ 6,500 00	
Expended to March 31, 1915	.....	$ 6,991 79
Balance overexpended March 31, 1915	491 79	
Total	$ 6,991 79	$ 6,991 79

14.—Drainage and Soil Cultivation.—Continued.

Drainage Work—			
Ditching machine		$ 2,930 01	
Renewals and repairs		444 42	
Supplies		595 71	
Tile		198 65	
Haulage and freight		430 05	
Engineer, services	$ 711 42		
Engineer, expenses	303 79		
J. A. Woods, foreman, services	722 00		
J. A. Woods, expenses	330 54		
Labour	100 25		
		$ 2,168 00	
		$ 6,766 84	
Less received for ditching		544 64	
			$ 6,222 20
Fertilizer Experiments—			
Grant to Agricultural Societies United		$ 500 00	
Supplies, fertilizer, etc.		242 92	
Labour		26 67	
			$ 769 59
Total			$ 6,991 79

Particulars regarding the purchase of ditching machine and its operation were set forth in the Report of 1913-14. The work was continued in a similar way in 1914-15. A part of the cost of the work in connection with fertilizers was charged to this item; also grant of $500 to the Agricultural Societies United, a fertilizer-purchasing organization.

16.—Teachers in Agricultural Schools.

Grant, 1913-14	$ 4,000 00	
Expended to March 31, 1915	.....	$ 3,918 60
Balance unexpended March 31, 1915	.....	81 40
Total	$ 4,000 00	$ 4,000 00
Robert Newton, Principal, Woodstock, salary		$ 2,141 66
" " expenses		403 38
B. T. Reed, Assistant, salary		900 00
" expenses		406 21
G. G. Moe, services, lecturing		14 00
" expenses		53 35
Total		$ 3,918 60

17.—School Gardens.

Grants, 1913-14, $1,500; 1914-15, $3,500	$ 5,000 00	
Expended to March 31, 1915	.....	$ 3,582 22
Balance unexpended March 31, 1915	.....	1,417 78
Total	$ 5,000 00	$ 5,000 00
Grants to teachers and trustees		$ 3,470 52
Prizes for gardens		88 50
Incidentals		23 20
Total		$ 3,582 22

The amount expended covered bonuses to teachers based on the condition of school gardens and grants to trustees for the purchase of equipment and supplies for same; also prizes for gardens. The bonuses to teachers varied from $10 to $25 each, and the grants to trustees from $10 to $15.

18.—Contingencies.

Grants, 1913-14, $509.93; 1914-15, $1,207.20	$ 1,717 13	
Expended to March 31, 1915		$ 940 73
Balance unexpended March 31, 1915		776 40
Total	$ 1,717 13	$ 1,717 13

M. A. McLeod and W. E. Palmer, expenses attending Canadian Seedgrowers' Convention	$ 97 70
Services of stenographers	640 52
One typewriter, Sussex Dairy school	117 00
Office supplies	45 25
Mailing seed-bags and postage	40 26
Total	$ 940 73

The expenditures under Sections Nos. 11, 12, and 15 were made in 1913-14, and were dealt with in the report for that year.

AGRICULTURAL AID ACT, 1912.—GRANT, $24,509.93.

SUMMARY STATEMENT of Expenditure, March 31, 1915.

Horticulture	$ 6,181 53
Insect pests	1,159 67
Stock and seed judging	3,877 64
Women's Institutes	3,960 84
Seed selection	406 11
Agricultural students	883 35
Dairying	2,024 95
Rural schools	983 09
Poultry	3,914 19
Contingencies	967 84
Total	$ 24,359 21
Balance carried forward to Miscellaneous, 1915-16	150 72
Total	$ 24,509 93

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURAL PURPOSES FOR THE YEARS 1912, 1913 and 1914, AND ESTIMATED EXPENDITURE FOR 1915.

Service.	1912, to Oct. 31.	1913, to Oct. 31.	1914, to Oct. 31.	1915, to Oct. 31, Estimated.
	$ cts.	$ cts.	$ cts.	$ cts.
Salaries and Travelling Expenses Department	5,904 10	6,499 68	7,019 06	9,450 00
Agricultural Societies	13,985 31	16,867 66	17,444 83	17,000 00
Dairying, and	4,650 74	4,092 28	3,039 53	6,800 00
Live Stock Industries	1,480 16	950 45	3,611 78	
Dairy School	402 80	537 03	4,067 99	1,000 00
Farmers' Institute	2,921 61	1,048 96		
Horticulture	5,494 17	4,155 67	1,999 37	2,000 00
Cold Storage	750 00	750 00		
Assistance to Scholars	981 05			
Poultry Raising	2,107 40	1,984 94	980 08	2,000 00
Crop Competitions, Seed Fairs	636 10	1,809 44	2,082 77	1,500 00
Exhibitions				10,000 00
Miscellaneous	443 32	309 59	355 00	1,500 00
Brown Tail Moth, etc	1,988 93	999 51	4,481 93	3,650 00
Bonus Mud Dredges			1,000 00	1,000 00
Bonus Clover Hullers				600 00
Advertising natural products				500 00
Limestone crusher and power				2,000 00
Farm settlement board				1,800 00
Totals	41,745 69	40,005 21	46,082 34	60,800 00

PRINCE EDWARD ISLAND.

The subsidy provided under the Agricultural Instruction Act and its allotment in 1914-15:—

Agricultural education in connection with Prince of Wales college.	$ 4,000 00
Short courses in agriculture	2,000 00
Live stock judging classes	500 00
Demonstration work in horticulture, sheep and poultry husbandry	2,000 00
Building for agricultural centre, Summerside	4,000 00
District representative work	4,500 00
Women's Institutes	2,500 00
Office assistance	1,000 00
Introducing nature study in public schools	7,332 81
Total	$ 27,832 81

OUTLINE OF WORK PERFORMED.

Elementary Agricultural Instruction: The financial assistance received by the province of Prince Edward Island under the Agricultural Instruction Act, is leading to a general reconstruction of all educational work, for the purpose of bringing it into closer touch with agriculture, which affords a means of livelihood, either directly or indirectly, to almost the whole population.

This assistance made possible the adoption of a much more comprehensive system of education than formerly existed, and, accordingly, the curriculum of the public schools has been enriched by the addition of Nature Study, School Gardening and Home Projects. The efforts of the Departments of Agriculture and Education were directed during the year to the perfecting of the system of Agricultural Education thus inaugurated.

In carrying on this new work it was necessary that there should be no duplicating of machinery or overlapping of activities. Instead of appointing one or more directors to supervise the rural science work as distinct from the ordinary subjects of the course, it was decided to regard the new study, not as something extraneous, but as a vital part of the ordinary school curriculum, standing on exactly the same footing as the other subjects of the course and supervised by the regular inspectors.

To provide for efficient supervision, the inspectorates were re-arranged and increased in number from five to ten, and five additional inspectors were appointed. The ten inspectors are nearly all practical farmers as well as practical educationists and are very well qualified for their duties. Each inspector has charge of a group of not more than fifty schools, all of which he can reach without travelling very far from home. He is thus able to give very close and careful supervision to his schools and to become a real educational leader in his small inspectorate.

To secure uniformity of work throughout the Province, and to prepare for the introduction of Rural Science, the inspectors met in Charlottetown for the first three weeks of the month of June, 1914, and held conferences, attended a course of lectures, and carried on practical work in a school garden.

The conferences resulted in the preparation of a course in nature study for the public schools, so amplified as to be of assistance to the teachers, and in a general programme of work for the year. The academic work consisted of thirty-one lectures on soil, insects, plants, drawing, etc. In the school garden, trees and shrubs were set out, and plots laid off and planted with grains, vegetables and grasses. The Dominion Experimental Farm, situated near Charlottetown, was visited, and information obtained that will be particularly useful in the planting of rural school grounds.

The course was planned by the Departments of Agriculture and of Education, and carried out by Mr. W. Davison, B.S.A., Provincial Instructor in Field Husbandry, and Mr. F. F. Smith, B.Sc., of Buzzard's Bay, Mass., assisted by the Superintendent of Education, the Secretary of Agriculture and other officials of the two Departments.

To insure still further the success of the new movement, the Department of Agriculture in July, 1914, provided a second summer school for teachers. This was held in Charlottetown, lasted three weeks, and was attended by about two-thirds of all the teachers in the province. For the guidance of these teachers a well thought out course in nature study was drawn up by educational and agricultural experts; and as an encouragement to put forth their best efforts teachers were given an opportunity to win a substantial bonus by doing well the work of the rural science course. To be entitled to this bonus a teacher must have a well kept school garden properly used in the instruction of the pupils and have also five home projects being conducted in five different homes. Five additional home projects are regarded as equivalent to a school garden and the more home projects successfully conducted the greater the amount of the bonus.

At the meeting of the School Inspectors held on December 3, 1914, they reported that 115 School Gardens had been established, or that arrangements had been made to carry them on in 1915. Home projects had been undertaken by 870 pupils, 545 had agreed to grow vegetable seeds, 58 schools had collections of weed seeds, ranging from 5 to 30 varieties, 18 had collections of mounted seeds, and 5 had collections of mounted insects.

"It is perhaps too early to speak of results, but the outlook is certainly encouraging," states R. H. Campbell, superintendent of education. "We feel that we are on the right track and that we are succeeding in making rural science a vital part of the training of country boys and girls."

Courses in Agriculture and Domestic Science: Besides the introduction of agriculture in the rural schools, other forms of the work of agricultural instruction are being carried on with increased vigour and new forms introduced. A four months' course in agriculture has been provided at Prince of Wales College for those young men who have left school and who intend to follow farming for a livelihood. It is not intended to be a preparation for any higher institution, and the particular circumstances of each pupil receive consideration as far as possible. When this course has been completed and the students have returned to their homes they will receive special attention from the department's staff of specialists.

Short courses in the various departments of agriculture and in household science were provided at Charlottetown. Ample provisions were made for all those who wished to attend the former, but less than half of the number who applied for the latter could be admitted. To place the students from the different parts of the province on an equality, the railway fare of all those who attend is paid by the Department of Agriculture.

Women's Institutes: The Women's Institute movement has made satisfactory progress and promises to exert a highly beneficial influence on rural conditions. Already thirty-one have been organized with a total membership of 750. The system differs somewhat from that of other provinces. The intention is to have the divisions correspond with the ten school inspectorates, with a field supervisor in charge of each, under the general direction of the superintendent. When organization is complete there will be ten assistants or supervisors. Two have already been appointed. The assistants are required to be constantly in the field among the institutes of their circuits to give demonstrations and lectures and to promote organization, assist at meetings, etc.

An institute may include one, two or three school sections, but not more than three. Regular monthly meetings are held, and it is the desire that the institutes

should centre their interests around the school and hold their meetings as a general rule in the school-house, thus bringing the mothers in contact with school-room conditions. An annual grant of five dollars is made to each institute on condition that six meetings are held during the year.

Much has been done by the Women's Institutes since the war began in connection with Belgian relief and red cross work.

The short course in household economics inaugurated in 1914 by the department, was continued in January and February of 1915. The course was held in conjunction with Prince of Wales College, Charlottetown, and was in charge of the supervisor of Women's Institutes, assisted by the field supervisors. Several new topics were taken up for the first time, namely, dietetics and nutrition, household furnishing, arrangement of an efficient kitchen, millinery, vegetable gardening, landscape gardening, tuberculosis, household administration, farm home conveniences, laundry, which were all well received.

New Appointment: To supervise the new work inaugurated by the department, W. R. Reek, B.S.A., Associate Professor of Husbandry at the Ontario Agricultural College, was placed upon the staff of the Provincial Department in the spring of 1915, as director of agricultural instruction. Mr. Reek has been given a general oversight of the work carried on under the Agricultural Instruction Act.

Summary: When the present plan has been completely developed, there will be at Charlottetown, the Department of Agriculture with the provincial staff of specialists. In each of the three counties there will be stationed a district representative who will be assisted by the agricultural and educational specialists, when their services are required. In the rural districts there will be school inspectors (who are at the same time agricultural instructors), and assistant supervisors of women's institutes, working in co-operation with one another, and receiving the assistance of the district representatives and the provincial experts. The schools will be taught by teachers who have had a training in nature study and in household science, and will have at their call the members of the staffs of the Departments of Agriculture and of Education. Those who have completed the common school course may continue their studies, either in agriculture or in household science at the institutions provided in Charlottetown.

"No encouragement, local or federal," states Hon. Murdock McKinnon, Commissioner of Agriculture, in his report for 1914, "has been so productive of good as the grant provided under the Agricultural Act."

FEDERAL SUBSIDY OF 1914-15. SUMMARY FINANCIAL STATEMENT, APRIL 1, 1914, TO MARCH 31, 1915.

Section No.	Classification.	Grant 1914-15.	Balance Forward Apr. 1, 1914.	Total.	Expended to Mar. 31, 1915.	Balance Unexpended Mar. 31, 1915.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1	Agricultural Education—Prince of Wales College	4,000 00	762 96	4,762 96	3,750 65	1,012 31
2	Short Courses	2,000 00	850 88	2,850 88	2,323 65	527 23
3	Live Stock Judging Classes	500 00	18 17	518 17	15 00	503 17
4	Demonstrations	2,000 00		2,000 00	1,760 34	239 66
5	Agricultural Building	4,000 00		4,000 00	4,000 00	
6	District Representatives	4,500 00	1,537 75	6,037 75	3,703 43	2,334 32
7	Women's Institutes	2,500 00	856 20	3,356 20	2,233 94	1,122 26
8	Office Assistance	1,000 00	83 33	1,083 33	1,014 03	69 30
9	Nature Study	7,332 81	2,189 54	9,522 35	8,657 44	864 91
	Totals	27,832 81	6,298 83	34,131 64	27,458 48	6,673 16

DETAILS OF EXPENDITURE, APRIL 1, 1914, TO MARCH 31, 1915.

1.—Prince of Wales College.

Grant, 1914-15	$ 4,000 00	
Balance brought forward	762 96	
Expended to March 31, 1915	.....	$ 3,750 65
Balance unexpended March 31, 1915	.....	1,012 31
Total	$ 4,762 96	$ 4,762 96

Prof. W. Davison, instructor field husbandry, salary and expenses	$ 862 29
Prof. W. J. Reid, instructor animal husbandry, salary and expenses	567 16
Prof. J. L. Tennant, instructor animal husbandry, salary and expenses	375 00
T. Ross, expenses	369 04
Scholarships, teachers in training	493 20
Railway fares of students	22 30
Premiums	110 50
Fuel, light	184 43
Supplies, feed	292 48
Services, labour, janitor	300 01
McGregor, contractor, account	140 29
Miscellaneous	53 35
Total	$ 3,770 05
Less revenue	19 40
Total	$ 3,750 65

The salaries and expenses of three professors, Messrs. Davison, Reid and Tennant, were in part provided for, the balance being devoted to scholarships, premiums and general expenses connected with the regular course in agriculture, held in the Agricultural Hall.

2.—Short Courses for Farmers.

Grant, 1914-15	$2,000 00	
Balance brought forward	850 88	
Expended to March 31, 1915	.....	$2,323 65
Balance unexpended March 31, 1915	.....	527 23
Total	$2,850 88	$2,850 88

Theodore Ross, salary	$300 00
J. L. Tennant, salary	125 00
F. T. Morrow, services and expenses	100 00
R. Creed, services	75 00
Scholarships	1,141 50
Supplies	182 71
Water and light	97 76
Labour	123 00
Miscellaneous	184 68
Total	$2,329 65
Less revenue	6 00
Total	$2,323 65

A short course in horticulture was held at Charlottetown from November 17 to December 5. Twelve students attended. Instruction was given in the making of apple barrels and in packing of apples in boxes and barrels by Prof. Leslie Tennant, B.S.A., of the Department of Agriculture, and by Mr. A. E. Dewar, president of the Fruit Growers' Association. Similar courses were held at Georgetown, Montague and Vernon River.

Short courses in animal husbandry, in cereal husbandry, and in milk testing were held from January 4 to 15, 1915. The number in attendance was 220. The practical work was carried on by Prof. W. J. Reid, B.S.A., instructor in animal husbandry, Prof. Wilfred Davison, B.S.A., instructor in cereal husbandry, Prof. J. Leslie Tennant, B.S.A., district representative for Kings County; Mr. J. A. Clark, B.S.A., supt. Experimental Farm; Mr. F. T. Morrow, inspector of cheese factories and creameries; Mr. Richard Creed, Albion, Kings County, and Mr. W. R. Shaw, of St. Catharines.

The expenditure covers scholarships, part salaries of instructors and incidental expenses, such as light and water, supplies and labour.

4.—Live Stock Judging Classes.

Grant, 1914-15	$500 00	
Balance brought forward	18 17	
Expended to March 31, 1915	.....	$ 15 00
Balance unexpended to March 31, 1915	.....	503 17
Total	$518 17	$518 17
J. M. Laird, expenses		$15 00

This appropriation was practically intact at the end of the year, and was carried forward and remained available for the subsequent year.

4.—Demonstrations in Live Stock, Poultry and Horticulture.

Grant, 1914-15	$2,000 00	
Expended to March 31, 1915	.....	$1,760 34
Balance unexpended March 31, 1915	.....	239 66
Total	$2,000 00	$2,000 00
Balance over-expended, 1913-14		$ 237 35
Walter Shaw, salary, 3½ months at $50		175 00
Supplies and incidentals		1,494 21
Work and expenses		244 27
Total		$2,150 83
Less revenue		390 49
Total		$1,760 34

Demonstrations in sheep-dipping were held in Queens and Kings counties, and about 7,500 sheep were dipped. In this work, the Island Sheep Breeders' Association acted in conjunction with the Department.

J. Leslie Tennant, B.S.A., district representative for King's County, conducted demonstrations in spraying, pruning, and grafting in different parts of the province. He had four assistants, two of whom completed the course at the College of Agriculture at Truro, N.S., and the other two the long course in Agriculture at Charlottetown. Most of the work was done in the vicinity of Montague, Summerside and Charlottetown, where it is intended to pack apples for export in the fall of 1915. Island orchards are reasonably free from insect attacks, but the Oyster Shell Bark-louse, Bud Moth and Canker worms have been doing some damage.

5.—Agricultural Building.

Grant, 1914-15	$4,000 00	
Expended to March 31, 1915	.....	$4,000 00
To town of Summerside for building	.....	$4,000 00

This appropriation was used for the purchase of a building at Summerside to be used as an agricultural hall for Prince County. This building is the headquarters of the county representative and is fitted up for the holding of classes in agriculture and domestic science and for meetings of the farmers of Prince County.

6.—District Representatives.

Grant, 1914-15	$4,500 00	
Balance brought forward	1,537 75	
Expended to March 31, 1915	.....	$3,703 43
Balance unexpended March 31, 1915	.....	2,334 32
Total	$6,037 75	$6,037 75

W. J. Reid, salary and expenses	$1,134 41
J. L. Tennant, " "	1,017 79
R. Robertson, " "	158 50
W. H. Coughlan, " "	196 33
Walter Shaw, " "	109 09
Leo. McDonald, " "	40 50
W. R. Reek, " "	260 40
Additional travelling expenses	233 10
Supplies	130 31
Prince Edward Island Poultry and Egg Association, cases	423 00
Total	$3,703 43

There are three counties in Prince Edward Island—Prince, Queens, Kings—in each of which instruction is given to farmers along practical lines in soil cultivation, crop production, live stock, horticulture. An instructor known as county or district representative is placed in charge of each county and gives his whole time to the work except when engaged at Charlottetown in connection with the special classes in short courses. The expenditure covers the salaries, office expenses, travelling expenses of these instructors and materials required for instruction purposes.

7.—Women's Institutes.

Grant, 1914-15	$2,500 00	
Balance brought forward	856 20	
Expended to March 31, 1915	.....	$2,233 94
Balance unexpended March 31, 1915	.....	1,122 26
Total	$3,356 20	$3,356 20

Institute grants, 27 at $5	$ 135 00
Mrs. Dunbrack, superviser, salary and expenses	1,033 38
Hazel Sterns, field supervisor, salary and expenses	332 20
Helena McDonald, field supervisor, salary and expenses	420 02
Alberta McFarlane, field supervisor, salary and expenses	132 26
Additional travelling expenses	51 22
Convention expenses	107 29
Miscellaneous	12 57
Total	$2,233 94

The expenditure under this head comprises a grant of five dollars to each of the 27 institutes, the salary and expenses of the supervisor and field supervisors. Having charge of the institute system, the supervisor conducts the correspondence and other work of the main office, visiting the institutes as often as possible. The course in household economics at the Prince of Wales College was held under the auspices of the Women's Institutes. The judging of household science exhibits at the county fairs is undertaken by the officers of this branch.

8. Office Assistance.

Grant, 1914-15	$ 1,000 00	
Balance brought forward	83 33	
Expended to March 31, 1915	.....	$ 1,014 03
Balance unexpended March 31, 1915	.....	69 30
Total	$ 1,083 33	$ 1,083 33

E. Pineau, salary	$ 376 67
A. W. Newberry, salary	413 33
E. Prouse, "	45 00
N. J. MacLeod, "	179 03
Total	$ 1,014 03

This expenditure was for extra clerical work at the Department, necessitated by the carrying out of the work inaugurated under the Agricultural Instruction Act.

9. Nature Study.

Grant, 1914-15	$ 7,332 81	
Balance brought forward	2,189 54	
Expended to March 31, 1915	.....	$ 8,657 44
Balance unexpended March 31, 1915	.....	864 91
Total	$ 9,522 35	$ 9,522 35

W. Cairns, Inspector, salary		$ 708 35
Chas. Buxton, " "		708 35
D. S. Fraser, " "		708 35
L. Adams, " "		672 94
W. Curtis, " "		605 09
Prof. W. D. Davidson, salary		383 34
Prof. F. F. Smith, salary and expenses		349 78
		$ 4,136 20
Scholarships		3,080 87
Expenses summer school, including expenses of instructors and others		1,384 83
Supplies, labour, materials, travelling, etc		463 49
Total		$ 9,065 39
Less P. E. I. government grant	$ 100 00	
Less New Brunswick government grant	100 00	
Less Nova Scotia government grant	200 00	
	$ 400 00	
Less other revenue	7 95	
		407 95
Total		$ 8,657 44

The expenditure covers the salaries of five school inspectors, salaries of instructors, the amount paid in scholarships, the outlay for materials, supplies and travelling, and the general expenses of the Summer School of Science.

The Summer School of Science is held every summer in one of the three Maritime Provinces. The three provinces contributed $400 out of provincial funds. In 1914 it was held at Charlottetown. There were 440 in attendance. Of these 113 were from the Provinces of Nova Scotia and New Brunswick and were purely Summer School of Science students. The remaining 327 were from Prince Edward Island and were chiefly teachers of public schools and school inspectors. Five hours each day were devoted to class work under the best specialists in the teaching profession that could be obtained. The remainder of the day was devoted to laboratory and field work, and to lectures and discussions. The teaching staff consisted of teachers in the Prince of Wales College, members of the staff of the Provincial Department of Agriculture and several specialists from outside the province.

FEDERAL SUBSIDY OF 1913-4.—SUMMARY FINANCIAL STATEMENT TO MARCH 31, 1914.

Section No.	Classification.	Grants 1913-14.	Expended to Mar. 31, 1914.	Balance Unexpended Mar. 31, 1914.
		$ cts.	$ cts.	$ cts.
1	Agricultural Education—Prince of Wales College	4,000 00	3,237 04	762 96
2	Short Courses	3,306 55	2,455 67	850 88
3	Live Stock	1,000 00	981 83	18 17
4	Demonstrations	1,500 00	1,737 35	...
5	Agricultural Building	4,014 96	4,014 96	.....
6	District Representatives	4,000 00	2,462 25	1,537 75
7	Women's Institutes	2,178 49	1,322 29	856 20
8	Office Assistance	1,000 00	916 67	83 33
9	Nature Study	5,529 85	3,340 31	2,189 54
	Totals	26,529 85	20,468 37	6,298 83

Sec. 4. Over-expended balance $237 35

All of the above balances, unexpended on 31st March, had been expended by 31st March, 1915, with the exception of $3.17 under No. 3, Live Stock, as may be seen by reference to statement for year ending 31st March, 1915.

DETAILS OF EXPENDITURE TO MARCH 31, 1914.

1. Prince of Wales College.

Grant, 1913-14	$ 4,000 00	
Expended to March 31, 1914	.....	$ 3,237 04
Balance unexpended March 31, 1914	.....	762 96
Total	$ 4,000 00	$ 4,000 00
W. Davison, salary, $750; expenses, $12.18		$ 762 18
W. J. Reid, salary, $775; expenses, $8.52		783 52
J. H. Blanchard, services		25 00
A. E. Dewar, packing-school		60 00
T. Ross, expenses		46 01
		$ 1,676 71
Heat, light, water		464 44
Labour and supplies		497 68
Scholarships		21 20
Furniture, $82; books, $66.05		148 05
Insurance		100 00
Miscellaneous		67 69
Balance transferred from Agricultural building account, Agricultural Aid Act Grant, 1912-13		261 27
Total		$ 3,237 04

2. Short Courses.

Grant, 1913-14	$ 3,306 55	
Expended to March 31, 1914	.....	$ 2,455 67
Balance unexpended March 31, 1914	.....	850 88
Total	$ 3,306 55	$ 3,306 55

2.—Short Courses.—Continued.

Scholarships and travelling expenses		$ 1,140 12
Lecturing—		
Theo. Ross, salary	$ 225 00	
" expenses	39 88	
Paul Boving, services	30 00	
Grace Dutcher, "	103 00	
F. T. Morrow, "	127 05	
B. Anderson, "	35 00	
R. Robertson, salary	150 00	
		709 91
Supplies, etc.		223 74
Painting, Agricultural building		142 40
B. Stewart, work		233 00
Miscellaneous		6 50
Total		$ 2,455 67

3. Live Stock Judging Classes.

Grant, 1913-14	$ 1,000 00	
Expended to March 31, 1914	.....	$ 981 83
Balance unexpended March 31, 1914	.....	18 17
Total	$ 1,000 00	$ 1,000 00
R. Robertson, salary		$ 300 00
W. J. Reid, salary, $250; expenses, $150		400 00
Sundry persons, expenses		208 00
Total		$ 908 00
Supplies		28 83
Isaac Ives, seat-stands		45 00
Total		$ 981 83

4. Demonstrations in Horticulture.

Grant, 1913-14	$ 1,500 00	
Expended to March 31, 1914	.....	$ 1,737 35
Balance overexpended March 31, 1914	237 35	
Total	$ 1,737 35	$ 1,737 35
E. B. McLaren, salary and expenses		$ 117 91
W. Shaw, salary and expenses		88 48
T. A. Benson, expenses, $25.87; expenses egg circles, $242.58		268 45
T. Ross, expenses		5 52
Total		$ 483 36
Poultry supplies		942 73
Live-stock supplies		162 25
Equipment		114 32
Express		26 22
Miscellaneous		12 47
Total		$ 1,737 35

5. Agricultural Building.

Grant, 1913-14	$ 4,014 96	
Expended to March 31, 1914	.....	$ 4,014 96
Chas. McGregor, contractor		$ 3,450 00
Land		450 00
Labour and supplies		89 48
Miscellaneous		25 48
Total		$ 4,014 96

6. District Representatives.

Grant, 1913-14	$4,000 00	
Expended to March 31, 1914	.....	$2,462 25
Balance unexpended March 31, 1914	.....	1,537 75
Total	$4,000 00	$4,000 00
R. Robertson, salary, $1,125; expenses, $293.92		$1,418 92
W. J. Reid, salary, $500; expenses, $124.96		624 96
Dr. J. McMillan, salary, $300; expenses, $26.50		326 50
Sundry persons, expenses		91 87
Total		$2,462 25

7. Women's Institutes.

Grant, 1913-14	$2,178 49	
Expended to March 31, 1914	.....	$1,322 29
Balance unexpended March 31, 1914	.....	856 20
Total	$2,178 49	$2,178 49
Mrs. A. E. Dunbrack, salary		$ 463 81
Miss K. James, salary, $458.34; expenses, $165.22		623 56
Miss H. McDonald		35 00
M. A. Martin		2 00
Total		$1,124 37
Twenty institute grants		100 00
Supplies		97 92
Total		$1,322 29

8. Office Assistance.

Grant, 1913-14	$1,000 00	
Expended to March 31, 1914	.....	$ 916 67
Balance unexpended March 31, 1914	.....	83 33
Total	$1,000 00	$1,000 00
W. J. McLeod, services		$570 03
A. W. Newberry, services		418 72
Total		$988 75
Less to local government		72 08
Total		$916 67

9. Nature Study.

Grant, 1913-14	$5,529 85	
Expended to March 31, 1914	.....	$3,340 31
Balance unexpended March 31, 1914	.....	2,189 54
Total	$5,529 85	$5,529 85
W. Davison, salary and expenses		$ 332 32
Twelve teachers, salary $50		600 00
Expenses, twelve teachers		354 92
Dr. S. Robertson, expenses		60 10
J. D. Seaman, services and expenses		107 95
Total		$1,455 29
Railway fares and bonuses to teachers attending summer schools		1,500 00
Books		172 45
Supplies		88 12
Maps, diagrams		124 45
Total		$3,340 31

AGRICULTURAL AID ACT, 1912. SUMMARY FINANCIAL STATEMENT.

Section No.	Classification.	Grant.	Expended.	Over-expended.
		$ cts.	$ cts.	$ cts.
1	Agricultural Building	4,000 00	4,261 27	261 27
2	Short Courses in Agriculture	1,951 47	1,951 47	(Charged to Agricultural Education, Prince of Wales College, 1913-14).
3	Live Stock Judging Classes	168 65	168 65	
4	Professor of Animal Husbandry	264 80	264 80	
5	Demonstrations in Horticulture	144 93	144 93	
	Totals	6,529 85	6,791 12	261 27

COMPARATIVE STATEMENT OF EXPENDITURE OF PROVINCIAL FUNDS FOR AGRICULTURE.

	1913 to Dec. 31.	1914 to Dec. 31.	1915 Appropriations.
	$ cts.	$ cts.	$ cts.
Farmer's Institutes	1,834 50	1,988 35	1,900 00
Field Competitions and Seed Fairs (net)	987 86	1,148 19	1,700 00
Exhibitions, grants	6,587 00	8,575 21	9,250 00
Associations, grants	1,361 90	1,247 00	
Miscellaneous, Dept. Expenses	3,450 38	4,806 72	4,950 00
	14,221 64	17,765 47	17,800 00

VETERINARY COLLEGES.

The Ontario Veterinary College, Toronto, and the School of Comparative Medicine and Veterinary Science, Montreal, participate under the Act in an annual grant of twenty thousand dollars on the basis of the number of students (British subjects) enrolled in the previous year. The apportionment for 1914-15 was made on the following basis:—

	Students.	Grant.
Ontario Veterinary College	199	$15,607 85
School of Veterinary Science, Montreal	56	4,392 15
Total		$20,000 00

One payment only has as yet been made to the Ontario Veterinary College, namely that of 1913-14, amounting to $15,371.91, which was expended as follows:—

Expenditure—	
To March 31, 1915	$ 8,287 10
From April 1, 1915, to October 1, 1915, approximate	4,377 39
Total	$12,664 49
Balance on hand, October 31, 1915	2,707 42
Total	$15,371 91
Services (to October 31, 1915)—	
M. D. McKichan	$ 149 99
S. A. Cudmore	125 15
H. G. Wilson	149 99
J. N. Pringle	78 85
A. H. Hunter, special investigation	496 89
Total	$1,000 87

The balance of the expenditure was for the following purposes:—Stationery, typewriting, postage, taxes, water rates, typewriter inspection, gas, telephone, printing, apparatus, supplies, ice, freight, equipment, laboratory supplies, "goods," etc.

The Ontario Veterinary College was founded by Andrew Smith, F.R.C.V.S., of Edinburgh, Scotland, in 1862. In that year there were but three students. For the year 1914-15 the number was 232, as against an average of 275 for the previous five years. This falling off, which appears to be entirely due to enlistment in the service of the Empire, was still more marked in 1915-16, when the number dropped to 189. But for the war, it seems likely that the attendance would have continued to increase.

In 1908, Dr. Andrew Smith resigned from the institution he had built up during his long term of office from practically nothing. During his regime, some three thousand students graduated. The college was then taken under provincial control, the course was extended from two to three years, and Dr. E. A. A. Grange, V.S., M.S., appointed as principal.

For the school's accommodation a new building was erected in 1914 at a cost of $250,000, as described in the report of last year. The College, which is in affiliation with the University of Toronto, grants the degree of V.S. (Veterinary Surgeon) and also qualifies its students for the University degrees of Bachelor of Veterinary Science and Doctor of Veterinary Science.

The number of students enrolled in 1914-15 was as follows:

Ontario Veterinary College.

	1st Year.	2nd Year.	3rd Year.	Total
Ontario	24	29	34	87
Other provinces	18	29	27	74
Great Britain	1	3	4	8
British West Indies	1	..	..	1
New Zealand	..	1	..	1
Total	44	62	65	171
United States	14	25	21	60
Cuba	..	..	1	1
Total	58	87	87	232

The following instructors of the Ontario Veterinary College are now serving at the front:—J. A. Amyot, M.B., A. R. B. Richmond, V.S., B.V.Sc., D. King Smith, M.D., V.S., Floyd D. Shaver, B.S.A., C. G. Saunders, V.S., B.V.Sc.

The School of Comparative Medicine and Veterinary Science of Montreal was formed in 1893 by the consolidation of two veterinary schools then existing in that city. The new institution became affiliated with Laval University (Montreal), and was taken under the patronage of the provincial department of agriculture. In 1913, a new building was provided for the school, and the Federal grants of 1912-13 and 1913-14, amounting to $7,628.09, were used entirely for equipment.

The following is a statement of receipts and expenditure for the year ending June 30, 1915:—

Receipts—	
Cash in bank, June 30, 1914	$ 173 44
Students' fees	2,082 50
Provincial government grant	3,500 00
Federal grant, Agricultural Instruction Act	4,392 15
Laval University	10,000 00
Rental of hospital	133 32
Loans	2,532 17
Total	$ 22,813 58

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Expenditures:—

Salaries of professors	$ 1,525 00
Salaries of officers	800 00
Expenses of administration, etc.	1,042 63
Rental of hospital	1,001 85
Equipment and laboratory furnishings	2,952 56
Loans repaid and interest	2,239 05
Land and new building	10,000 00
Total	$ 22,561 09
Cash on hand, June 30, 1915	252 49
Grand total	$ 22,813 58

The number of students enrolled each year since 1909 was as follows:—

1909-10.	1910-11.	1911-12.	1912-13.	1913-14.	1914-15.	1915-16.
56	55	57	59	60	59	58

The following graduates are known to be serving at the front:—Lt. Col. Piché, Major Duhault, Capt. Daigneault, Capt. Coulombe, Capt. Grignon, Lieut. Trudel, Lieut. Guertin, Lieut. Rainville.

APPENDIX A.

THE RURAL SCHOOL AND SCHOOL CONSOLIDATION.

PARAGRAPHS AND EXTRACTS.

From The Banker-Farmer, Champaign, Ill.

"When all our roads are good roads; when country schools are good schools; when farms produce larger yields at greater profits; when farmers unite to upbuild rural life—

Then the children of the farm will scorn to desert this fairest of places for crowded cities; population will be more evenly divided, for many who struggle for a crust in the city will find plenty in the country; wealth will be more evenly divided; there will be less of the doctrine of hate and more of the gospel of love; there will be more 'happiness.'"

In Wright County, Iowa, the Superintendent of Education inquired of five or six hundred children in the rural schools what they proposed to do as their life work. Over 95 per cent of the girls and 85 per cent of the boys declared that, whatever they did, they would have nothing to do with farming.

Two years from that time the question was sent out again to the same schools. Over 70 per cent of the boys and 82 per cent of the girls declared for farming as an occupation. The teaching of agriculture and domestic science in a practical way had been introduced during the two years. That had made the difference.

Consider the position of a child in any of the more remote sections of the rural districts in America to-day, and ask yourself what his opportunities are for training and development and efficiency as compared with those of a similarly endowed boy in an urban community. All that the average country boy has access to is an ungraded school, usually taught in one room by a girl with less training than a high school graduate, receiving $40 or $50 a month for seven or eight months in the year, teaching all ages in thirty or more classes a day. If by any chance a boy survives this and desires to go further it is necessary for his father to put him on a train, buy his transportation, send him to a town, pay his board, his tuition, and lose his services during the session, and probably lose him permanently from the country. I have said it before and I am not afraid to repeat it that I do not quite see how a father and mother who are ambitious for their children can gain their own consent to continue to live in remote rural districts under existing conditions.—SECRETARY HOUSTON.

Indiana has consolidated schools in eighty-two out of ninety-two counties. Its law discontinued all schools having attendance of twelve or less and permits those with less than fifteen to be closed.

Since 1904 they have held great educational mass meetings throughout Virginia, addressed by the foremost speakers—statesmen, publicists, educators and others. The message these men carry to every neighbourhood is: "A chance for every child, whether living in the city or country, whether white or black, persuading the community that it is bound to train every child for the community's own sake."

"Turn now," said Professor Christie, of Purdue, "to the children of native stock engaged in the basic industry of agriculture. We find them tramping down a muddy road into a little bare, two-by-four school room that has no pictures, no shrubs, no

books, no laboratory, where they are taught by a girl sixteen to eighteen years old, just out of high school, with no training, burdened with a multiplicity of duties. And we say that upon these native farmers' boys and girls the hope of America depends."

All over the United States there are springing up rural schools which take farm life as their educational plant and get an education for every child out of that life. Beginning in seed-analysis, seed-testing, milk-testing and the like, they are gradually transforming the old, dead rural school into a new kind of school in which every education process is related to the life of the community. These schools are becoming the laboratories, the counting rooms, the workshops, the economic and social centres of their communities.

Our system of education is a survival of the times when more knowledge was the test of culture. The university is operated in the interest of the graduate school; the high schools assume that every pupil will go to the university or college, the primary and secondary schools are based on the theory that every pupil will pass through all the grades above, and finish with the equipment of a college professor. This is not only absurd—it is criminally absurd.

With every pair of hands there goes a brain. Just how expert the hands may become is dependent on the brains behind them. To the strength of the hands there is a limit; but the resources of the brain are illimitable.

That part of the human being which has no limit to its capacity for expansion is stunted by miseducation, and that part most obviously necessary in production left almost entirely untrained.

A purely academic course of study—the kind we now have—causes the school to became an active emigration bureau, and either depopulates the community or at least keeps it at a stagnant standstill.

People in the city and people in the country must alike assume the duties and responsibilties of citizenship, therefore their schools should be rich in the things needed in the preparation for life and for citizenship, whether one live in the country or city.

The country schools must teach whatever farmers and farmers' wives need to know, because they live in the farm home on the farm and make their living from the soil, unless knowledge of these things can be obtained more thoroughly and more economically through some other agency.

The most important question of citizenship in this country is the improvement of the public schools for the better and fuller education of the boys and girls of the country. The most pressing and difficult phases of this important problem consist in the readjustment of the content of the courses of study on the basis of what the men and women in the country need to know, and in putting into the schools and keeping there teachers prepared to teach these things skilfully and well.

Is it good business, good citizenship or good sense to pay the men and women who are preparing our children for the duties of life less than we pay day labourers on the streets and in factories?

The hope of the agriculture of the future lies with those who are found on the road to school each morning with their dinner pails and bundles of books. If out of the generations that are now coming to majority we shall not find the means of an agricultural uplift then we have a serious cause for discouragement.

If anyone has ever entertained the notion that our college of agriculture, great as it is, will ever train within its walls more than a small percentage of the people on

the land, he has entertained a fallacy. The most important function that the college of agriculture will perform is in the training of young men and women for leadership in the agricultural field. Whatever knowledge a great majority of the boys and girls of the open country will get out of their environment and of the principles underlying the vocation of farming must be obtained from the public school system.

We must set ourselves seriously at the building up of a sound social and educational life. We are in the grip of fallacious notions if we think that successful spraying and tillage, better varieties of fruit and better methods of handling, however important these may be, are the fundamentals of country life welfare. The social and moral setting of the farm is vastly more important in agricultural welfare than are the technical operations of crop production.

Our whole educational system especially in the elementary and secondary grades falls far short of its purpose and cost. The country children suffer much the most, for their schools are not as good even as the town and city schools, and they should not be discriminated against. Rarely do the country schools shape their work so as to interest the children in the great work of agriculture in which their fathers are engaged.

Farmers have been known to pay as much to a hand or twice as much to a good herdsman as to the school teacher—who may make or mar the whole future of their children.

Our future farmers should come from the ranks of our own people. If we cannot make farm life sufficiently attractive to hold our boys and girls to the old home there is something wrong.

It is ridiculous to see a teacher of this sort who may not know barley from beans, attempting to teach agriculture in a flower pot in the winter time to red-blooded rural youths; yet such has been the teaching in a great part of our rural schools.

After forty years of agricultural education, such as it has been, we are confronted with relatively worse conditions than when scientific agriculture first began to receive serious attention. Average yield of farm crops has been practically at a dead level; the soil is being exhausted at an alarming rate; tenantry is increasing; the rural population is shifting to the city; and the cost of living rises at a rate far in excess of increased capacity to pay. The facts are simply that the data of agricultural science has not been effectively put into possession of the men who till the soil.

A wider education is needed to make agriculture keep pace with the demands upon it and this can be achieved only by vocational schools of agriculture within the reach of every boy on the farm.

Any form of school that weakens the child's interest in the life of his community is deficient in the elemental requisite of the school as an agency of civilization. Something is radically wrong with a school in an agricultural community that develops motormen, stenographers and typewriters and fails to develop farmers, dairymen and gardeners. A course of study prepared with the view of correcting this condition of the first step in reform.

The problem involved in giving an education which shall meet the vocational needs of all the people and which shall promote the bases of prosperity—industry and agriculture—and which shall conserve the resources of the nation, are vast and formidable. All that has been done in vocational education is as nothing compared with that which is yet to be begun. The need for vocational education increases faster than the facilities for providing it.

SESSIONAL PAPER No. 15c

CANNOT GROW BIGGER THAN THE SCHOOL.

A leading educator said recently in Ontario:

"If the schools are in a decadent state, the coming generation will have ideas so commonplace that the whole country will suffer, industrially and socially, as well as in the real object of national life—the making of big men and big women. The people of the country will be no bigger than their schools. Too many of the rural school trustees have proved themselves incompetent to handle the case—just as the average farmer falls down as a roadmaker."

A CONTRAST.

THE ONE-ROOM SCHOOL. *Probability.*	VS.	THE CONSOLIDATED SCHOOL. *Possibility.*
Poorly paid and poorly equipped teachers, who change frequently		Trained teachers who stay.
Teachers who know little or nothing of agriculture		Specialists in agriculture, household economics and farm mechanics.
A young girl without experience, at $30 to $40 per month		An opportunity for men teachers to re-enter the school.
A bare, unattractive building, badly ventilated, heated and lighted		A commodious, sanitary, modern building, a centre for a new social life for the community.
Education after the city model Education away from the farm		Education meeting the needs of Country life.
Inefficiency		Supervision, equipment, libraries and apparatus.
Waste of effort		Grading of pupils; larger classes; greater interest; more rapid progress.
Failure to sustain pupils' interest		Pupils remain at school because the schools fit their requirements.
No advanced work		Possibilities of high school work, thus affording high school privileges at home for rich and poor.
A long walk in wet and cold		Comfortable transportation, preserving health.
Small circle of acquaintance		Increased social life for pupils.
Results not adequate to the cost		Full value for expenditure.

CONSOLIDATION OF RURAL SCHOOLS IN THE UNITED STATES.

Review of Bureau of Education Bulletin No. 30, 1914.

"Consolidation of schools" is the term used where two or more school districts are made into a single district, one school in one building replacing two or more schools in several buildings.

The primary motives underlying the movement are (a) better education facilities, and (b) decreased cost of education on the school district.

History and Extent: The movement for consolidation with a view to securing better educational opportunities for children, had its beginning in Massachusetts in 1875. In 1882 the State abandoned the single district organization and adopted the township unit organization. Consolidation then became much easier, and the movement advanced more rapidly. In 1895 the State provided for the union of two or more townships in sparsely settled districts, which further stimulated consolidation. At the present time the State has comparatively few one-room schools left. Of nearly 16,000 teachers, fewer than 900 are employed in one-teacher schools.

From Massachusetts, the movement spread to other Northeastern States and the West and South. In Ohio in 1912 there was complete or partial centralization in 192 townships out of 1,370 in the State. The new school laws of 1914 were designed to promote centralization, and the township basis was changed to the county basis. In 1912 Indiana had 589 consolidated schools, distributed in 73 of the 92 counties of the state, and 37 per cent of the rural pupils were attending such schools.

These three States, Massachusetts, Ohio and Indiana, have established a greater proportion of consolidated schools than any other States, but it is doubtful if a State can be found in the Union without several examples of successful consolidated schools.

It is noted that the movement has gone furthest in States with large administrative units for school affairs—that is with the county or township organization, and that it has made little headway in States with the small "school district" unit; except in a few instances where state aid has been relatively large. This is illustrated by the States of Indiana and Illinois. Indiana, organized on the township basis, has 600 Consolidated Schools; Illinois, on the district basis, has less than 50. In the latter, school affairs are managed by three trustees in each district. The result being that 30,000 trustees manage 10,000 one-teacher schools and 10,000 teachers. Experience shows that sometimes the district trustees are the most difficult persons to convince of the advantages of consolidation.

In the United States the movement for consolidation has assumed several different forms. In North Carolina for example, two and sometimes three-teacher schools are replacing one-teacher schools. All are located within walking distance of the pupils' homes. In a carefully laid out district of 10 or 12 square miles ($3\frac{1}{2}$ miles square), with a schoolhouse at or near the centre, few children have to travel more than a mile and a half to and from school. Some counties in Louisiana and elsewhere have limited the number of grades to five in one-teacher schools. For the more advanced grades, a central school is provided to which pupils are transported at public expense.

STATE LEGISLATION CONCERNING CONSOLIDATION AND TRANSPORTATION.

That consolidation can make little progress without favourable school laws is well understood. A survey of the laws in force in the several States on this subject makes it apparent that in only a few States are the education authorities given power to consolidate schools without first securing a qualified vote in the districts affected. Certain States have such power, however; others may close schools where the attendance is less than the prescribed number. Schools in Indiana, for example, whose average daily attendance falls below 12 in any year are closed at the end of the year by State law, and the children conveyed to some other school at the expense of the district. In Louisiana the average daily attendance must be more than 10, in Maine 9, Ohio 12. In New Mexico 25 is the minimum, and in Texas 20.

In the majority of States the votes on consolidation are taken simultaneously in each district affected, and must have a majority vote in every district. Under this system one district often succeeds in blocking a movement that is wanted by all the others. In New York, Minnesota, Iowa and Missouri, each district sends representatives to a central meeting, and a majority vote of those present is sufficient to carry the measure.

In several states, special state aid is given to stimulate consolidation. Rhode Island allows to any township consolidating three or more schools, the sum of $100 annually for each department. Washington grants each consolidated school $170 annually for each district entering into the consolidation. Iowa assists such schools in maintaining courses in agriculture, domestic economy and industrial subjects. Vermont partly reimburses towns for moneys expended for transportation. Wisconsin gives aid in erecting and equipping the school building and also to transportation. In Minnesota the amount of state aid depends upon the classification of the consolidated school. This is known as the Holmberg Act. It has been copied in part by several States, and is of particular interest.

EDUCATIONAL ADVANTAGES.

That the consolidated school offers many opportunities that the one-teacher school cannot offer, is generally recognized. Principal among these advantages are the following:

(1) Adequate supervision of the teaching work is made possible: Under average conditions the county superintendent cannot visit his schools more than once a year owing to loss of time in travelling. This time is saved with consolidation. In a school large enough to require several teachers, a supervising principal may not only manage the school, but supervise the work of his assistants.

(2) *Classification of pupils.*—In the ideal school children are grouped in classes, each class containing as nearly as possible, children of the same degree of advancement. Competition creates enthusiasm among the pupils. This is lacking in a class of two or three. A teacher can teach a class of six to twelve pupils much easier and accomplish a great deal more than a class of two or three. The number of classes is little, if any, greater in a consolidated school of 150 pupils than in a one-room school of twenty-five pupils. By combining six such schools the work is easily done by four teachers, each giving better service.

(3) *Division of time between study and recitation.*—Better educational results are obtained through the better division of the pupils' time. In the typical one-teacher school in the United States the pupil spends about one-eighth of the school day in recitation and seven-eighths in study (or in idleness or mischief). With eight grades of pupils and from twenty-six to thirty-two recitations to be conducted each day, almost the whole of the teacher's time is taken up in hearing recitations; she has little time for teaching. Consolidation makes fewer classes to each teacher. If four one-teacher schools with eight grades in each are brought together into one school and four teachers retained, each would have but two grades instead of eight, and the pupils would devote one-half their time to recitation and one-half to study.

(4) *Special subjects of utilitarian value may be taught.*—Little can be taught under the difficult conditions of the one-room school but "the three R's." The teacher can give little agricultural work, manual training or domestic science. These are "living" subjects to most boys and girls; they are part of their lives. Not only have they practical value, but may form a foundation for academic work. These subjects, together with music, drawing, sanitation, etc., may be taught in the consolidated school.

(5) *High school grades may be easily added to the consolidated school.*—Consolidated schools of any size are seldom found without high school departments. In rural sections served by one-room schools pupils must be sent away from home for their high school education, if they are to receive any, to the nearest town or city, where they are drawn away from country life, to say nothing of the injury that often results from the removal of home influences at the period in their lives when such influences are most needed.

The formation of high school departments is probably one of the greatest results accomplished through consolidation, making advanced education practicable to many who would otherwise have been debarred from it. Many are stimulated to take high school work through the enthusiasm of their class-mates who otherwise would have failed to complete the elementary work. A great increase in high school students has been the result.

(6) *Socializing influences.*—Pupils gain much education and breadth of view in contact with the larger number of pupils met in the consolidated schools. This influence spreads through the community. It is difficult for the one-teacher school to

be a social centre; it is easy for the consolidated school to become such. Teachers like to live and work where they may have the association of other teachers. In consequence better teachers may be obtained.

(7) *A permanent teaching staff.*—In schools of four or more teachers relatively few changes take place. There is never a complete change of staff, as always takes place in a one-room school when the teacher resigns, the result being that the child's progress is delayed. Permanency is essential in making a school efficient. A good principal is always essential. Teachers' homes in connection with consolidated schools are becoming common.

(8) *General results.*—A larger enrolment, more regular attendance, longer terms. Where transportation is furnished the improvement in attendance is very marked.

TRANSPORTATION OF PUPILS.

Authority is given by forty-three state legislatures to expend public funds for the transportation of children to schools, provided the children live outside of a reasonable walking distance. Consolidated districts of from 9 to 12 square miles may be established without transportation. Certain States require that transportation shall be furnished where the distance to be travelled to school is 1½, 2 or 2½ miles, as the case may be. In other States the law is permissive only.

The success of furnishing transportation seems to be universal wherever properly handled. The details are of extreme importance, for the consolidated schools to which children are conveyed cannot be satisfactory unless the transportation itself is satisfactory.

The case is well stated by the Superintendent of Public Instruction for the State of Indiana:

"The great objection which must be met in consolidating our rural schools is transportation. Many parents object, and with good cause, to the fact that their children are transported too great a distance and that they are compelled to leave home too early in the morning and are returned too late in the evening. This demonstrates that the unit of consolidation is too large. A readjustment of the consolidated area should be made, and the pupils affected should be transported a reasonable distance. In rural communities where good roads cannot be maintained throughout the year the people must be content with the district school. Where the unit of consolidation is not too large transportation of pupils has made attendance larger, more regular, and eliminated tardiness. Transportation has been a great aid to the health of the children. They are not compelled to walk through the rain and in the mud, wearing wet shoes all day. In the majority of places where we have consolidation the school officials have been very careful to get responsible men as drivers of the school wagons. Consequently, the pupils are under the care of some responsible person all day, the girls are protected on the way to and from school and the boys influenced from the temptation to quarrels and other misconduct.

"The success of the consolidated school depends in very large measure upon transportation. If the transportation is safe, comfortable, rapid, and in charge of men of high character, no troubles result from it. When men of low ideals are in charge of transportation or when transportation is slow, or when the distance is too great, then certain evils are at once seen, and just complaint is made against the consolidated schools. These evils, however, are all remediable. If the people demand drivers of high character they can be secured. If the officials insist upon rapidity of transportation that too can be done. None of these evils in any way affect the real work of consolidation."

While the wagon is the usual form of conveyance furnished at most schools, many children are transported in all parts of the country by steam and electric roads. In Massachusetts, California and other States, motor busses are coming into use.

The expense per pupil in Connecticut is given as $23.69 for the school year of 181 days, in Minnesota as $21.70, or 14.5 cents per day, in Iowa as $20.70, in Northern Ohio $15 per year, or 9 cents per day.

COST OF CONSOLIDATED SCHOOLS.

Experience proves that the cost of education per child is less in consolidated schools than in one-teacher schools. The smaller the attendance the greater the relative cost. When the cost of transportation is added, however, the cost under consolidation is found to be considerably greater than under the old system.

The most complete study of the relative cost of consolidated and non-consolidated schools is that made by the State of Illinois. These figures show that the total cost of the consolidated schools, not including transportation, was $33.89 per child; in the district schools, $36.31, or $2.42 more. This goes to show that the district schools are not as economical, so far as the cost of education itself is concerned, as the consolidated schools. When transportation is added, the consolidated schools cost $12.81 more than the district schools. To offset this, the educational opportunities given by the consolidated school are far greater. Practically all the consolidated schools in the State maintain high school departments, and the per capita cost in high schools is always greater than in elementary schools. The consolidated schools were maintained twenty days longer during the year than the district schools, they employed better teachers at higher salaries, and also a principal who supervised the work of the other teachers. It would appear therefore that the advantages of consolidation more than compensate for the increase in cost due to transportation.

CONSOLIDATION IN ONTARIO.

In respect to consolidation of rural schools, this movement has made, as yet, little progress in Ontario. There are only two consolidated schools in the province, that at Guelph established originally through the generosity of Sir William Macdonald, and not in itself, from the economical standpoint, a good illustration of how school sections may be combined to advantage, and the other at Hudson in New Ontario, where one school is made to serve a large area. The latter is not sufficiently well established to serve for purposes of illustration and comparison. The school laws contain provisions by which rural school boards may combine. But thus far, no progress of moment has been made.

CONSOLIDATION IN QUEBEC.

By J. C. Sutherland, B.A.

The school year which closed in June, 1915, was the first under the new system of special grants from the Government of the province to aid consolidation of rural Protestant schools. In making these grants, the Government recognized the fact that the Protestant schools are more particularly in need of this plan of concentration. The response of the school boards has not, however, been very marked. There is still a good deal of hesitation about accepting a new system. Part of the aid for the year was given to boards which had already adopted the principle of conveyance. Practically there was only one case of new "complete" consolidation—the word "complete" being used to denote the union of several elementary schools into a model school. In Quebec, of course, the model school corresponds to an advanced public school, doing part of high school and therefore well equipped to do good work in agriculture. A considerable amount of ordinary ("partial") consolidation, where the

school is not raised to higher rank, is constantly reported by the inspectors. This, in general, is due to economic necessity, and special aid is not asked for as the saving in salaries for the conveyance of the few pupils requiring it.

The sentence above with regard to the "response of the school boards" needs some modification. A number of them are anxious and willing to adopt the system, and recognize that there is no alternative in many municipalities, but too often, their hands are tied by opposition of the districts. The attachment to a wretched schoolhouse, attended frequently by only half a dozen pupils, is inexplicable, on reasonable grounds when conveyance to a good, well-equipped and well taught school is possible, but it is a condition which progressive boards have to meet constantly, and which they find difficult to overcome. Constant public education on the question is still required. The strongest incentive to consolidation should be the realization of the fact that it affords the opportunity of giving a better and broader education than the one-roomed school possibly can give, but too often, apparently, this higher ideal is not grasped.

In the July, 1914, number of the *Agricultural Gazette* I pointed out one advantage that Quebec possesses in the matter of bringing about consolidation, namely, that the school municipality in this province is a large unit, usually embracing a whole township, with anywhere from two to twenty or more schools under the one board. This advantage may sometimes work disadvantageously, however, as the following illustration will show. Two years ago partial consolidation was adopted in a certain municipality in the eastern townships. Two schools were closed, and the pupils conveyed to a third in a village centre. Apparently the experiment was most successful. The inspector was able to report that the average attendance from the two closed districts was greatly improved. The pupils enjoyed the ride to school, and went far more regularly than when the schools were at their own doors. But at the end of the second year (last June), opposition to the plan arose. The chief ground of the opposition was that "it was costing more" than under the old system and the ratepayers had the "proofs" in their school tax bills. As a matter of fact the plan had not cost anything more than the old system. The saving in two salaries had paid for the conveyance. But the school board had increased the tax rate from 35 cents to 50 cents on the hundred dollars, not on account of the consolidation, but to meet increased expenditure, in teachers' salaries, etc., all over the municipality.

At the time of writing (July) several new complete consolidations are expected to be in operation in September. One of these will receive special aid from the Hon. Sydney Fisher, who is anxious that the experiment should begin with the adoption of nature study teaching and elementary agriculture by a trained teacher of those subjects. The Hon. Mr. Fisher is the chairman of a sub-committee of the Protestant Committee dealing with the question of extending the work on these lines in the rural schools.

The Department continues steadily to encourage the consolidation movement, and if nothing spectacular can be announced at the present time in this direction, there is, at least, the promise of steadily awakening interest in the subject.

CONSOLIDATION IN MANITOBA.

Educationalists in Manitoba regard the small school as the weakness of the educational system. In 1910, 62 districts operated schools having an average attendance of 5·1 per school at a cost of $111.54 per child. In other districts the attendance ranged from 77·9 to 11·7 per school, and there were 129 schools in which the average attendance was 7 or less.

The usual difficulties were met with—among them the difficulty of securing good teachers, the difficulty of maintaining attendance, and the difficulty in inducing children to remain at school after the age of 14.

The question of consolidation first received attention in 1905. At that time many regarded it as impracticable in Manitoba, where the winters were cold, roads bad, and settlement sparse. In 1906, two consolidations were effected, and since that time the number has increased each year, there being 40 such schools in 1912, and 78 in 1915. After nine years' trial the statement is made that consolidation is fulfilling the highest expectations, and is overcoming many of the difficulties under which the ordinary small rural school labours, besides solving many of the problems of country life.

The school inspectors have done much to promote the movement by quietly but persistently doing missionary work while on their rounds from district to district, and by giving information to meetings of trustees as to the procedure necessary to bring the improved system into effect. The work is in charge of a special agent on consolidation, a former school inspector, who is thoroughly conversant with the subject.

The campaign for consolidation conducted by the Department, and the successful working of a large number of consolidated schools has resulted in a marked change in the attitude of the public in regard to them. Public opinion has been educated, and now displays in all parts of the province a very keen interest in educational matters in general and in school consolidation in particular.

To-day there is a far stronger feeling in favour of the movement than ever before. All sections of the province are discussing the question, and, in many, decisive action is being taken. Figures prove that a far larger number of rural children are receiving the benefits not only of education but of a far superior education than was the case under the old system. While there are still some who fear the extra cost of transportation of pupils involves, it is seldom that any other objection is urged against the new system. A strong proof of the satisfaction consolidation is giving is that there is not one case on record in Manitoba where a consolidated district ever manifested any desire to dissolve and return to the old conditions.

Cost.—While it is true from the experience of the Manitoba consolidated schools that the operating cost is greater than was usually the case under the old system, it is realized that if the returns for the money spent are made the test, then consolidation is the cheaper; that is to say, there is a better return for the money spent. Some of the largest consolidated schools are costing the least to operate, in a few cases, but a small fraction more than the merged schools cost. In the two largest districts, Starbuck and Roblin, the average operating cost for three years was $13 per quarter section in the former, and $12 per quarter section in the latter. The cost of consolidation is met by the taxpayers, aided by generous grants from the Department of Education.

Transportation.—This problem appears to have been solved satisfactorily, for in spite of bad roads and inclement weather, comparatively few van trips are missed. It was commonly supposed that the distance to be travelled and the time consumed would be too long. This, it is pointed out, is a matter entirely in the hands of the trustees. If shorter routes are desired, more vans can be put on. Experience goes to prove that seven miles is not too long a van route, and that it may, under ordinary conditions, be travelled in an hour. The average cost per day of running school vans is placed at $3.

Starbuck.—This consolidation comprises three districts or 59½ sections of land. The site, which cost $1,000, consists of 10 acres. The school is built of brick on stone foundation, two stories high, with full sized basement, and ventilated class rooms, a laboratory, a room for chemical and physical apparatus and a library. In the basement are two play-rooms which can be thrown into one. Drinking water is supplied to each room, and a modern fire escape is provided. Sanitary lavatories, furnace room, coal room and store room are provided.

The cost of building, site, furniture and equipment was $17,000. This was met by the sale of the old school properties and the issue of debentures.

The staff consists of a principal and two female assistants. The work includes all the grades of the elementary school and for second and third class teachers' certificates.

Average levy for three schools before consolidation, 15·1 mills or $9.66 per quarter section.

Average levy for three years since consolidation $14.29, or an increase of $4.63 per section.

The following shows the cost of the school for one year:—

Receipts.

Legislative grant	$ 520
Municipal grant	960
Transportation grant	750
Total	$ 2,230

Expenditure.

Teachers' salaries	$ 2,250
Caretaker	260
Sec.-treasurer	50
Transportation	1,500
Fuel	400
Incidentals	140
Total	$ 4,600
Less grants	2,200
Amount to levy	$ 2,400

The advantages of consolidation in this instance are thus briefly stated.

(a) Comfort, convenience, equipment, beauty. Large and attractive grounds. Better heating, lighting and ventilation.

(*b*) Pupils travel comfortably in all weathers; arrive in better condition for work; attend more regularly.

(*c*) Better grading, better supervision, resulting in better work in the time allotted.

(*d*) Free high-school education for rich and poor alike.

(*e*) Better facilities for taking up special courses in agriculture, school-gardening, nature study, domestic economics and manual training.

Roblin: Six districts were consolidated in 1912 to form the Roblin (Goose Lake) school. The area served comprises 94 sections of land and the village of Roblin, and is said to be the largest in the Dominion. Eight vans transport 100 children. The longest route is nine miles and the shortest six miles. In the first year of operation only one trip was missed, and that on account of illness of the driver. Except where the houses are close to the road the vans call at the doors. The drivers have the same authority over the children as the teachers have.

Two male and two female teachers were employed in 1912, the number being afterwards increased to five. The balance of cost in 1912, over and above the grants received was made up by a special levy of $12 on a quarter-section, or 15 mills. The taxes were less than in some rural districts where only three or four children attend. The staff includes an agricultural specialist, and has introduced courses specially suited to the farm boys of the district. The success of this school is said to have greatly exceeded expectations.

Courses in Agriculture: Five schools in the province, namely, Dauphin, Roblin, Holland, Stonewall and Teulon, have added agricultural specialists to their staffs and have introduced a course specially suited to farm boys. This course extends from November until March and thus accommodates boys who are obliged to work on the farm during the summer. The work covered during two winters is similar to that covered by students of the first and second years at the Manitoba Agricultural College. Some of the boys who have taken two winters' course, purpose continuing their education at the college. During the summer, each boy carries on home projects in alfalfa growing, seed selection and crop rotation.

At the close of each winter term, a judging contest is held at the Agricultural College for teams from these classes. Three boys represent each school in the following competitions:—

(1) Cattle judging—beef type.

(2) Cattle judging—dairy type.

(3) Horse judging—agricultural class.

(4) Grain judging—wheat, oats, barley for seed purposes.

(5) Milk-testing—the percentages of butter-fat.

CONSOLIDATION IN SASKATCHEWAN.

In 1913, an amendment to the School Act was passed to permit the area of school districts to be enlarged to fifty miles, such districts to provide for the expense of transporting pupils who resided more than 1½ miles from the school. Under the above, 11 districts were organized in 1913 and 1914. Nine of these are still in operation, but two have reverted owing to the difficulties and expense of conveyance. Much higher work is being attempted in these schools than was possible in the rural school. Many possess from three to six acres of land, and the way is being prepared for rural high schools in which the pupils will receive a sound general education, with a good knowledge, theoretical and practical, of the sciences intimately connected with agriculture and rural life.

Many difficulties have been experienced, among them, sparse population, opposition on account of increased taxation, and the distance to be travelled. Consolidation has made a fair start, however, and is resulting in better teachers, buildings and grounds and more regular attendance. The rate of taxation varies from $13 to $30 on a quarter section, and although slightly more than the ordinary rural school, the ratepayers are generally well satisfied with the value received for the money spent.

From report on Consolidation in Saskatchewan, 1915, by A. W. Cocks, Director of School Agriculture.

THE MACDONALD CONSOLIDATED SCHOOLS.

Under the Macdonald Rural School Fund, four consolidated rural schools were established between the years 1903 and 1905, one in each of the four provinces—Ontario, New Brunswick, Nova Scotia and Prince Edward Island. In each case a new building was erected to take the place of the small schools previously serving the sections consolidated. They were equipped with classrooms, assembly halls, and also for manual training, household science and school gardening. These subjects were included in the course of instruction to contribute to the end the founder had in view—to build up an interest and improvement in rural life. Specially trained teachers were provided, and the children were conveyed to and from school in school vans.

It was agreed that for a term of three years the sections interested should contribute an amount equal to their average previous payments for school purposes. To this the statutory grant was added, and expenses over and above being met by the fund. At the end of the period the people were to decide by vote whether to continue the school and assume its support or go back to the old system. Further financial aid, however, was contributed in all cases from the fund after the agreement had expired.

The following description of the Kingston School in New Brunswick will indicate what was provided in buildings and equipment.

"The Macdonald building is a commodious structure placed on a lot of about three acres. On the ground floor are two rooms for the younger pupils, a store-room and a manual training room well equipped with benches and tools. On the first floor are two rooms for more advanced pupils, a laboratory, a library, and a room for household science, which includes sewing, cooking, laundry work, home nursing, and sanitation. Under the roof is a spacious assembly room, while the large, airy basement is used as a playroom in bad weather. The grounds are well laid out and planted. In the rear of the building is a playground, and a school garden and orchard, and on one side stabling accommodation is provided. The difference between the course of study here and in the ordinary country school is sufficiently suggested by the difference in equipment. The orchard, the grafting tools, the pruning knives, the spraying apparatus, and the kitchen with its household appliances, the sewing tables, the benches and tools, the laboratory for indoor work in winter—all utterly foreign to the ordinary school—are here for a definite use.

OUTLINE OF THE MOVEMENT AND ITS RESULTS.

Ontario.—Five rural districts in the county of Wellington were consolidated in 1904 in a school near the city of Guelph. The city itself was not included. At the end of the three years, three of the districts withdrew, and two now comprise the consolidation, with about 40 additional pupils from surrounding districts in attendance. The situation of the districts withdrawing was such that pupils had to be conveyed across the city to the new school. To this fact may probably be attributed the main reason for the withdrawal.

Increased expense has been the chief criticism, "the ratepapers not having arrived at the point where they considered industrial subjects of sufficient significance to warrant the cost of the undertaking." But it is to be noted that only one ratepayer who had children at school in the three retiring districts voted for withdrawal, and that the majority against continuing was small in every case.

The kind of education that this school was established to demonstrate still continues.

New Brunswick.—The Kingston Consolidated School was opened in 1904, and served an area that was formerly seven rural school districts. Some of them had maintained school only part of the year. The population is sparse, and consequently the distance the vans travel is long. The roads are rocky and hilly, and the expense of conveyance is heavy.

The Director of Elementary Agricultural Education in New Brunswick says that the school was entirely successful from the outset, and has done excellent work. Both enrolment and attendance increased. After graduation, many pupils continued their education at normal school, college, or elsewhere. Many pupils under the old system would never have risen above the fourth grade.

At the end of the three years, all districts voted to continue the consolidation. The Macdonald assistance has now been withdrawn entirely, and the school is supported by the people assisted by provincial grants.

Nova Scotia.—The Macdonald School located at Middleton was opened in 1903, eight sections consolidating. The cost of operating was about $11,000 per year for the first three years, nearly half that sum going to meet the expense of transportation.

The school was admittedly greatly superior to any of the individual schools. The manual training and home economics departments became very attractive, not only to pupils but to parents as well, and lent a new interest to school life. The pupils appreciated the changed conditions, and seemed happy and contented in their work.

After all assistance from the fund ceased, all except one small district adjacent to the town withdrew from the consolidation. Here again the cost of transportation proved the stumbling block. At the present time the work in manual training and home economics is being continued, but agricultural work has been abandoned, and classics more generally introduced.

Prince Edward Island.—Hillsboro was selected for the Macdonald School in this province. Six districts were consolidated, and the new school opened in the summer of 1905. Each of the districts had previously had a one-room school of "uninviting and cheerless surroundings." Boys over twelve usually attended for only a few months in winter, and the total salaries of six teachers amounted to $1,190.

At the end of the three year agreement, three of the six districts remained in consolidation and agreed to pay 40 cents on $1 property valuation as against 11 cents under the old system. This was supplemented by statutory grant, and, as in other cases, a further contribution was made from the Macdonald fund. Dr. Jas. W. Robertson made up the difference. While the school was apparently successful in bringing about the form of education the promotors had in mind, it nevertheless was closed in 1912 for lack of financial support. The buildings and equipment remain idle, and the one-room district schools are vainly attempting to do the work of educating the boys and girls of the community.

ONTARIO.

PUBLIC SCHOOLS IN 1912.

	Rural.	All Public Schools.
Number	5,313	5,939
Number of pupils enrolled	210,732	405,725
Average attendance	114,181 (54%)	251,475 (62%)
Amount expended in sites and buildings	$559,600 (24·14%)	$2,469,767
Amount expended in rent, fuel, and other expenses	$731,658 (19·11%)	2,108,222
Amount expended in teachers' salaries	$2,808,200 (55·25%)	5,652,747
	$4,152,678	$10,230,736
Cost per pupil enrolled	19.70	25.21

The attendance in the rural schools of the province decreased ten per cent in the ten years, 1903-12.

NOTE.—While the average attendance in all the public schools of Ontario was 62 per cent of the enrolment, the average attendance in rural schools was only 54 per cent.

In the same year, in Manitoba, the average attendance in all schools was 55 per cent of the enrolment, but the average attendance of pupils conveyed to consolidated schools was 73 per cent of the enrolment.

APPENDIX B.

SCHOOL INSTRUCTION IN AGRICULTURE, FARM MECHANICS AND HOME ECONOMICS.

Agriculture in High Schools in the United States.

Sixteen years ago, or even ten years ago, states the report of the United States Department of Agriculture for 1912, the public high school was hardly thought of as an effective agency for the education of the rural people along vocational lines. Of recent years the growth has been increasingly rapid. At the present time (1912) such schools constitute over eighty per cent of the agencies engaged in teaching agriculture in the United States, excluding the one-teacher elementary schools.

Wherever the teaching of agriculture has been taken seriously, wherever suitable equipment and capable teachers have been provided, the schools and everyone connected with them have been benefited: the attendance has increased, the school work has assumed a more business-like air, as if it dealt with the realities of life, with real problems instead of imaginary ones. Where the high school reaches out to the surrounding homes and farms for its problems and illustrative material, it soon acquires a hold and exerts an influence upon the community such as other schools have never been able to get. It is not merely that a new subject has been added to the curriculum, but the school has changed front. Instead of trying to educate a select few for professional positions it is endeavouring to educate for everyday callings in the home neighbourhood.

The type of school coming under review is the public high school in which a department of agriculture has been established, or a teacher of agriculture employed, or an agricultural course conducted by a science teacher who has had some agricultural training.

In eleven states financial aid is given by the state to the teaching of agriculture in high schools. Many more encourage such work, some by subsidizing teachers' training courses, and all but Delaware and Rhode Island have one or more high schools in which agriculture is taught. In all there were in 1912, 1910 high schools and academies teaching agriculture. Of that number 289 were receiving state aid and 1,621 were not.

A study of the distribution of public high schools in which agriculture is taught reveals the interesting fact that 77 per cent of them are contained in the two groups of states in the Mississippi valley, known as the North, Central and South Central States. The remainder are distributed about evenly between North Atlantic, the South Atlantic and the Western States. When it is remembered that the central groups of states contain two-thirds of the farm population, this distribution does not seem disproportionate. Nor is it surprising that the agricultural colleges in those states enroll over 64 per cent of the college students in agriculture in the United States.

States granting specific appropriations in 1912 for agriculture, manual training and home economics.

Virginia.—Appropriation, $65,000, including $25,000 to aid schools in providing buildings and equipment and $10,000 to aid them in conducting extension work. Object, to provide courses in agriculture, home economics and manual training. Ten schools, one in each congressional district are dividing the funds equally through the State Board of Education.

Maine.—This state grants a sum not to exceed $500 a year to any one school to aid instruction in the departments referred to. Eight high schools received aid in 1912.

Minnesota.—Grants $2,500 a year to 30 high, graded or consolidated rural schools maintaining such courses. Also $1,000 a year to 50 schools maintaining courses in agriculture, and either in home economics or in manual training.

Louisiana.—A grant of $50,000 a year is used by the State Board of Education in subsidizing high schools maintaining agricultural departments. The minimum requirements are: a demonstration farm of five acres, an option on an additional five acres, a barn for horses and cattle, fertilizer and tool rooms; tools, implements and teaching apparatus up to a certain value, a horse or mule. The districts must appropriate $250 or more annually for maintenance. The teacher of agriculture must be a college graduate with practical farming experience. He must confine his teaching to agriculture, but may include botany and zoology, if these subjects are given an agricultural trend. He must be employed by the year. In 1912, twenty-five schools had qualified for state aid.

Maryland.—Four-year high schools having not less than 80 pupils and 4 teachers, two of whom teach agricultural and kindred subjects, receive an annual grant of $800. Three-year high schools having 35 pupils and two teachers receive $400 on account of a special subject. In 1912, six schools qualified. This aid is intended to encourage good salaries for teachers as well as to stimulate the teaching of the special subjects referred to.

New York.—Legislation provides for grants to schools maintaining special departments for not less than 38 weeks in the year. Each course must have at least 25 pupils and employ one teacher exclusively. For the first department $500 is given, and $200 for each additional department teacher. Classes of book study only are not entitled to benefit. In 1912, 17 schools qualified.

Kansas.—Appropriates $25,000 to enable the State Board of Education to give $250 for the maintenance of a course in agriculture and home economics in high schools having a normal training course. One hundred schools applied for state aid in 1912.

Massachusetts.—Pays two-thirds of the salary of teachers of agricultural departments of high schools, provided such departments meet the approval of the State Board of Education "as to organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction," etc. The State Board has moved very cautiously in making its plans for these schools, and has made its requirements so rigid as to type of teacher and co-operation of neighbouring farmers in the practical instruction that in 1912 only four schools had qualified.

North Dakota.—Conditions under which assistance is given are similar to those in Minnesota.

Texas.—Appropriates $50,000 a year to duplicate local appropriations. The high schools are divided into three classes, and the grants made for all three subjects in schools of the first and second class, agriculture receiving $500 to $1,500, home economics and manual training from $500 to $1,000 for each course. In schools of the third class only agriculture is aided to the extent of $500 to $1,000. The maximum state grant is $2,000. In 1912, 34 schools received aid.

Wisconsin.—The provisions are similar to those of New York. The agricultural course involves four high school units in agriculture and agricultural chemistry. Fifteen schools qualified for grants in 1912.

Summary.—With state aid varying from $250 to $5,000 to each school, nearly 300 high schools had in 1912 employed special teachers of agriculture and secured more or less special equipment for the class room, laboratory and field work of the students.

FARM MECHANICS IN HIGH SCHOOL AGRICULTURAL COURSES IN THE UNITED STATES.

Progress is evident in making the farm mechanics work of the high school applicable to farm conditions. The shopwork as carried on in many of the schools has up to the present savoured too much of manual-training exercises in city schools, but in some schools, at least, this class of work has been reduced to a minimum, and the making of useful articles for the farm, like gates, fences and small buildings has taken the place of cabinet work and patterns for the foundry. Similarly in the forge shop, the making of rings, hooks, clevises, etc., and the repair of farm machinery is taking the place of fancy work for exhibition purposes. Pupils are learning to put in waterworks, plumbing, concrete walks and foundation; to make small greenhouses, lath houses, and cloth houses for horticultural work, and to actually erect some of the buildings needed by the school.

In the rural engineering phases of instruction there is usually some drainage work, irrigation in semi-arid regions, and shopwork. The field work in drainage includes some practice in surveying, planning, and occasionally in laying drain tile on school farms. (Yearbook, United States Department of Agriculture, 1912.)

HOW MINNESOTA'S SCHOOL SYSTEM MEETS THE DEMANDS OF RURAL LIFE.

REVIEW OF U.S. BUREAU OF EDUCATION, BULLETIN NO. 20 "THE RURAL SCHOOL SYSTEM OF MINNESOTA."

Minnesota is an agricultural state with an area of 83,365 square miles, divided into 86 counties, and having a population, in 1910, of 2,075,708. Minnesota appreciates the value of a system of schools organized to prepare farm boys and girls for life on the farm.

Perhaps no other State has been quite as successful in establishing a system of schools intended to meet the demands of modern rural life. Under that system rapid progress is being made in organizing or reorganizing the schools with that end in view.

The fact is recognized in Minnesota that preparation for life in rural communities can be given, but only in schools that are organized to meet rural needs. The one-teacher school cannot provide the kind of education demanded in preparing the children for practical and contented life on the land. The one-teacher school was a pioneer institution. It answered well enough the needs of pioneer days when the farm produced whatever the family needed in the way of food, clothing and tools. In the days when the manual industries were taught at home the schools could devote all their time to cultural book elements. To-day the average home can no longer teach these elements nor can it supply the information needed by a generation of commercial farmers. Hence the schools must take over the responsibility by offering courses in agriculture, household economics, manual training, or farm mechanics, and other vocational subjects.

Minnesota presents a variety of units of school organization. Throughout the central and southern parts of the State, the small districts with their one and two-teacher schools prevail. Some are well built and well taught, but many are inefficient and can do little or nothing towards improving modern agricultural life.

Small school units cannot maintain strong farm schools, and a large number of States in the Middle West, including Minnesota, are seeking to attain a more satis-

factory unit of organization than the prevailing small district. Minnesota affords a notable example of what may be done for consolidation and centralization in the large undivided districts in the northern part of the State. The larger the unit, apparently, the easier it is to consolidate the schools, and experience in Minnesota seems to point to the county as the natural unit of school organization wherever it is the unit for civic administration.

The Minnesota schools are striving to make all their activities more practical. Formerly, the sole aim of the common school was to prepare pupils for a high school lying beyond the reach of a large majority of the pupils. The schools and courses of study are now being reorganized and designed to provide both knowledge and skill, and by supplying "industrial instruction" to fit for immediate life activities.

Under excellent guidance on the part of its educational leaders and sane and liberal aid laws, a remarkable system of industrial schools has been established throughout the State. Some of the schools coming within the classification rank as State high schools; some as Holmberg Consolidated Schools, and some as associated schools. In all these schools, agriculture, household economics and manual training are of first importance.

At the present time 40 high schools and two graded schools receive the annual special aid of $2,500 under the Putnam Act, and 81 additional high schools and 15 additional graded schools receive special aid of $1,800 under the Benson-Lee Act. These schools receive additional aid as State high schools or as consolidated or associated schools. To qualify for the Putnam grant, a school must maintain distinct departments in agriculture, household economics and manual training. To qualify under the Benson-Lee Act a distinct department of agriculture and a department in either household economics or manual training must be maintained. For these subjects specially trained instructors must be employed. Each school drawing special aid for agriculture must provide land for school garden, experiment and demonstration. Under the Putnam Act not less than five acres is necessary. The schools are required to organize short courses whenever advisable for young men and women who cannot attend the regular courses. Also agricultural extension courses for old and young, given in co-operation with the State College of Agriculture and the three secondary State schools of agriculture. In this work the county agricultural instructors lend valuable assistance.

The departments of agriculture are well equipped and taught by agricultural college graduates. The course is of cumulative growth, beginning as nature study in the early grades, continuing as text-book work in the higher grades, and taking up farm crops and live stock in the first two years of high school work. The best equipped schools offer in their third and fourth years work in soils and farm management. In 1912-13, 3,631 students were enrolled in agriculture, and in 1913-14 the number had reached 4,053.

None of the departments is more popular than that of household economics. More than 12,000 students take courses in some or all of its phases. The large consolidated high and grade schools offer courses extending over eight years. The wholesome in food and the every day practical things of home life receive most attention.

In manual training the work usually extends through the last three years of the elementary schools, and in the high school, throughout the entire course. Many schools have forge rooms, and even the rural schools in school associations are generally equipped with benches and tools. Farm articles are included to a marked extent in the list of articles made. The number of students in this department was 7,350 in 1913-14, and each year since the movement started has shown a considerable increase over the previous years. The total number of students in all industrial departments in 1913-14 was 23,882 as against 8,894 in 1909-10.

CONSOLIDATED SCHOOLS.

Several States that have striven to consolidate their schools have failed on account of unreasonable laws. Others have been slow to act because they had no state-aid features to offer as an inducement for the change. In some States consolidation has meant only the merging of a number of small schools into a large one, and providing the new school with the traditional town school course of study. It is of little avail to consolidate the schools for country people if merely gathering children together is the end of the reform. If consolidation is to be done well, the new school's course of study, while offering the broadest general culture, must first of all be rooted to the soil, and its activities must reach beyond the four walls of the school into the entire school community.

Consolidation in Minnesota has been done well; the new schools fulfill the promise of providing the right kind of education for rural communities. In this lies the secret of the substantial growth of the movement. While some states have a larger number of such schools, few, if any, have better consolidated schools than Minnesota.

Previous to 1912, Minnesota had practically no consolidated schools. In 1911, the legislature, by passing the Holmberg Act., adopted consolidation as a state-wide educational policy, the object of the measure being to promote a real improvement in rural schools and to encourage the teaching of the elements of agriculture, manual training and home economics. To this end the Act provided such financial aid as to make it possible for rural communities to maintain for their children, in the open country or in the rural villages, graded and high schools as good in every respect as those in urban communities, and at a cost no greater than that in such communities.

The first year under the operation of the Act, 141 old districts were formed into 60 new districts. At the present time the number is 116, with several groups in the process of organizing. The progress of the movement has been particularly strong in the northern part of the State where the small districts have never had a very strong hold upon the people.

The socializing activities resulting from consolidation are regarded as of the greatest importance. The consolidated school became a social centre. The assembly hall is used for neighbourhood gatherings, extension lecture courses, farmers' and women's institutes, boys' and girls' clubs. In this way the schools are able to provide modern substitutes for many of the rural activities that disappeared with the household economy stage of farming.

These schools extend their educational opportunities to old and young alike. They make it possible for young people, who for good reason cannot attend school regularly, to take valuable short courses, or even, in some instances, evening and correspondence courses, while some have short courses for parents. The consolidated schools are also intended to serve as distributing points for the fund of information collected by the Federal Department of Agriculture, and the State College of Agriculture.

The special features of the Holmberg Act are in brief as follows:—

1. Subject to the approval of the Superintendent of Public Instruction, two or more districts of any kind may be consolidated, either by the formation of a new district or by annexation of one or more districts to an existing district in which is maintained a State-graded, semi-graded or high school. In the latter case, consolidation is effected by vote of the rural districts only, but the consent of the board of the existing school is necessary.

2. A vote upon consolidation is secured on petition of 25 per cent of the resident freeholders of the district.

3. Consolidation is voted on at one polling place for all districts petitioning, and is carried by a majority of the votes cast.

4. The board of a consolidated school is authorized to establish schools of two or more departments, provide for the transportation of pupils, or expend a reasonable amount for room and board of pupils whose attendance at the school can more economically and conveniently be provided for by such means, locate and acquire sites of not less than two acres and erect and equip suitable buildings thereon.

5. For the purpose of receiving State Aid, schools are classified as A, B and C.

Class A must consolidate 18 sections, or an equivalent area; must have at least four departments, and give instruction in agriculture, manual training and household economics. Grant $1,500.

Classes B and C must consolidate 12 sections or an equivalent area, the former maintaining three departments and the latter two departments. Industrial instruction must be given. The annual grants are $1,000 and $750 respectively.

Consolidations of less than 12 sections may be formed but do not qualify for grants under this Act.

All schools must be in session at least eight months, provide transportation or its equivalent, and conform to the required standard for teachers, buildings and equipment as laid down under the Act by the Superintendent of Education.

Towards building construction a special grant is given equal to 25 per cent of the cost, the maximum amount being $1,500. The building must be modern in arrangement, equipped with a central heating plant, fan ventilation, water pressure system and sanitary appliances. Lighting, seating, library facilities, and apparatus must be up to the standard of the best village and town schools of a corresponding grade.

Great stress is laid on the necessity of securing teachers of the best training and experience, the standard required being the same as for high and graded schools in villages and cities. The principals are considered vital factors to success, and in addition to meeting the regular professional requirements, must secure the special endorsement of the State Superintendent. To the end that they may be in sympathy with the purpose of the movement they are given a six weeks' summer course at the State Farm School each season. Besides doing regular class work in agriculture and manual training they meet with some State representative of consolidated schools for one hour each day and discuss special problems.

During the school year 1911-12 there were transported 911 children at a cost of $21.70 per child. The average number of days of attendance is 150, making the daily cost per child about 14·5 cents. In schools not consolidated partial reports show about 1,500 transported at a cost of $18 per child. The average number of days of attendance in these schools is 90, making the daily cost about 20 cents per child.

STATISTICS OF THIRTY CONSOLIDATED SCHOOLS IN 1911-12.

Number of separate districts combined to make 30 consolidated schools		[illegible]
Average area of consolidated districts		35 miles.
Expenditure for buildings	$	201,548
Total assessed valuation	$	5,483,733
Number of children enrolled		[illegible]
Number of children transported		932
Total number of routes maintained		60
Longest distance transported		4½ miles.
Total cost of transportation	$	18,414
Average cost of transportation per child per year		19·75
Average cost of schooling per child per year including transportation		[illegible]
Total cost of maintaining schools including interest on bonded debt	$	139,252
Total amount contributed by the State towards cost of maintenance		[illegible]
Total amount left to be raised by local taxation		[illegible]
Number of schools maintaining at least one year of high school work		21
Number of accredited State high schools		3
Number of accredited State graded schools		11
Number of pupils in high school classes		395

ASSOCIATED SCHOOLS.

This form of organization contemplates bringing about an intimate relation between a centrally located village or town school and all the small rural schools within the usual trading radius of the village or town community. It is designed to act as a compromise when consolidation is objected to as doing violence to time-honoured ideals and traditions, and as a compromise it has proved satisfactory to all concerned. Association is often the first step towards consolidation.

The striking feature of the system is that all the districts entering into the Association retain their independent organization for local purposes, including the general control of the home school. At the same time they become merged into one large district—the associated district—for all matters of common educational interest, under the general management of an associated board. The superintendent of the central school is held responsible for the work done in the association schools, and adequate supervision for all is in this way provided. The services of the industrial teachers of the central school are also extended to the rural schools, so that the latter in a manner become parts of one complete system centering in the village school.

This form of association was made possible by the Putnam Act, an act that has revolutionized school work in the public schools of the State. This law not only provides for instruction in agriculture, manual training and household economics in certain high and graded schools, but it makes provision whereby rural schools may become associated with such schools in the manner described, and thus receive the benefits of these subjects on equal terms with the village schools.

Such a system when fully developed embraces many activities, all directed from the central school. It may include, in addition to the industrial courses, a variety of short courses, an experimental farm of five or more acres, extension work, and a local training school for rural teachers. It thus makes possible a real community school, combining the resources of town and country, and enabling town-folk and country-folk to realize that they are members of one common body who must work together in harmony to mutual ends. The plan is economical, for, by avoiding duplication, competent instructors may be employed; class education is avoided; the town school is improved by the attendance of country students, and the country students are improved by mingling with town students, and, where a local training branch is maintained, a supply of rural teachers is established. The influence of such a school will be in favour of greater production, co-operation in marketing, improved roads, speedy transportation, reasonable hours of work, all tending to promote homes of thrift and contentment.

In equipment, including school farm, and laboratory facilities, in courses of study and aggressive extension work the associated and consolidated schools are almost identical, and the following example will serve to illustrate both classes of schools.

Spring Valley School.—Spring Valley is a village of 2,000 people, situated in a well-to-do farming community in the southeastern part of the State. A modern building equipped for agriculture, household economics and manual training was erected, enabling the school to draw annual State aid of $2,500 under the Putnam Act. A self-supporting farm of 16 acres is maintained where all agricultural students learn the practical phases of the subject. In 1911, in response to invitation, fourteen districts voted for association. No district has since withdrawn, and others that at first declined have since requested admission.

The superintendent and the industrial teachers make regular rounds of the outlying schools, and send out lesson-guides for the industrial work. The rural teachers report regularly. Uniform text-books and equipment are supplied to the districts at a saving of cost through the office of the association. The equipment to each rural school includes a double bench and sets of tools and a complete cooking outfit.

During five months of the school year the older rural pupils spend one afternoon each week at the central school engaged in industrial study, the work begun being continued through the week in the home school, and reported upon the succeeding week.

A three months' short course is open to young men and women over fifteen years of age. Instruction is given in English, farm arithmetic and accounts, civil government, farm sanitation, spelling, penmanship, and industrial work. A junior course is also a feature. At this, prizes are offered for various exhibits such as corn, rural school displays, etc.

The instructor in agriculture, who has charge of the school farm, acts as advisor to the entire farming community, planning buildings and silos, and giving instruction in types of live stock. Occasional night meetings are held at outlying school houses, where farm topics of all kinds are discussed.

Of the 200 students of high-school grade pursuing industrial subjects, 50 per cent were from associated rural districts. This speaks for the influence of the system in keeping rural children in the small schools and "pointing" them for the central school.

The cost of the school in 1914 was:—

Salaries, 5 teachers (2 for 4 months only)	$ 4,140
Agriculture	955
Home economics	414
Manual training	1,014
Unclassified	803
Total	$ 7,326

The State paid the following amounts—

Aid for 3 industrial subjects	$ 2,500
Bonus ($150) for each of 14 districts associated	2,100
Total	$ 4,600

Amount levied on associated district	$ 2,300
Average cost to each district on average assessed valuation	100
Less State refund of $50 to each associated rural school	50
Average cost to each district over and above the local expenditure	$ 50

Chatfield Associated Schools.—Chatfield is a village of 1,300 people, and the association comprises 11 districts. The school is organized practically in the same way as the Spring Valley School. During the past five years the attendance has increased over 50 per cent owing to the attendance of pupils in the high school grades from the surrounding districts. The children in the small schools consider themselves as members of the central school, and after completing the eight years at the former, many become regular students at the central school or else enroll for the three months' short course.

The supervision of the associated schools, the short course work and the extension work are carried on as in the Spring Valley school. This school was instrumental in establishing a co-operative laundry, which was probably the first of its kind in the United States.

Seed corn is tested by the advanced students for the community, and the value of this work alone has, in the opinion of the superintendent, many times paid the salary of the agricultural teacher. In the same way, milk and cream are tested, farmers' clubs and institutes organized and maintained, and illustrated lecture courses conducted at the rural schools.

COLLEGE EXTENSION IN HOME ECONOMICS.

A MACDONALD INSTITUTE EXPERIMENT.

In Ontario, in 1915, an experiment was undertaken by the Macdonald Institute, the Home Economics department of the Ontario Agricultural College, which had for its object the extension of the instruction given in the Institute's three months' Homemaker course to girls who are unable, for various reasons, to attend the institution at Guelph.

Demonstration lectures on cooking, housekeeping, sanitation, hygiene, home-nursing and kindred subjects had for several seasons been offered by the Institute's Branch of the Ontario Department of Agriculture through the Women's Institutes. Perhaps it was the considerable measure of success attending such work that led to the conviction that many girls would avail themselves of the Macdonald Short Course if they could secure it without the necessity of leaving home. At any rate, when Miss M. U. Watson, the Macdonald Institute director, suggested to the head of the college that, as an experiment, a local branch should be organized, offering the Homemaker course, the proposal was at once concurred in.

An agreement was then entered into with the Women's Institute at Ayr to establish such a school. The Macdonald authorities undertook to provide a first-class teacher, a room and the equipment necessary, charging the regular fee of $15 per pupil. The Women's Institute, on its part, undertook to guarantee a class of not less than twenty.

An article by Miss Watson, which appeared in the "Farmer's Advocate," outlined the details. A circular was sent to every family in the neighbourhood and an energetic canvass made by the Women's Institute. The Public School Board offered a vacant school-room. A cheap but practicable domestic water-system was installed including a cistern, boiler and sink, all properly connected with roof-pipes, stove and waste receptacle. All the equipment necessary for classes in cooking, sewing and laundry work was assembled. This, while not elaborate, included every convenience that a well-appointed home should possess. A few dollars spent in repairs, whitewash, scrubbing and curtains made the place clean and attractive. The tables were on trestles, and the cupboards consisted of packing-cases, but everything essential was there.

The Macdonald graduate selected to take charge of the school, Miss Theodora Jobb, who combined with first-class professional standing and teaching experience a real enthusiasm for the work, qualifications which contributed greatly to the success of the undertaking.

The class opened towards the end of September with 22 students, seventeen of whom were farmers' daughters who drove to town from a distance of one to six miles on five days a week for twelve weeks.

The instruction given dealt with plain cooking, laundry work, care of the house, foods, sanitation, home-nursing, English, and optional work either in millinery and undergarments or shirt waists and embroidery. During the course a number of girls made clothing equal in value to their tuition fee.

The pupils were regarded as regular college students and were entitled at the end of the course to write on examinations which would admit them to the second term's work of the Macdonald Homemaker Course. A local friend of the Women's Institute offered a scholarship of $75 to be competed for.

Not only in practical but in inspirational value was the course a great success. Already other places are sending in requests for similar schools, and the indications are that the experiment at Ayr may lead to many such schools being established, so that in time every girl may have an opportunity of securing special instruction in the things that make for efficiency in the conduct of the home.

NOTE.—See special articles in "Farmer's Advocate," London, Ont., December 23, 1915, and "Farmer's Magazine," Toronto, December issue.

APPENDIX C.

FARM DEMONSTRATION WORK.

"The Farmers' Co-operative Demonstration Work has clearly established the principle of demonstration through co-operation with the farmer as a means of disseminating agricultural knowledge. A great many very able men have advocated the establishment of what they have termed "demonstration farms," which are entirely different from the method used by the department in this work. These single model farms or experiment stations doubtless attract a great deal of attention and serve to disseminate considerable useful and valuable information to the farmer, but it has been clearly shown by this work that the carrying on of 25 to 150 demonstration farms in a county in co-operation with farmers will much more rapidly place the necessary information in the possession of the man who needs it than will the maintenance of one model farm. The doing of the work by the farmer instructed is a means of driving home the lesson in a much more emphatic and lasting manner than the occasional observation of a farm located at a distance from his home." (Year Book U.S. Department of Agriculture, 1911.)

More than a million dollars annually is expended for demonstration work in the South. Of this amount $375,000 is furnished by the Government, the balance coming chiefly from county appropriations, assisted by a grant of $250,000 from the General Education Board, generally known as the Rockefeller Foundation. There are 940 agents engaged in the work, made up as follows: Government 483, General Education Board 254, Girls' Canning and Poultry Club Agents, (also Education Board) 203. In the northern and western states 190 county agents were employed in 180 counties in 1914. Sixty of these are supported by state and local funds. Applications from 298 additional counties were turned down for lack of funds.

"The biggest factor in 1915 will be the County Agent—the practically scientific and scientifically practical man who takes science to the farm. With the Lever Bill in effect, there will be more of him than ever."—The Banker-Farmer.

"Books and class-room instruction, and agricultural extension work are all right in their way, especially for the young. But the real aid to immediate advancement in farm work is to show the farmer just what he can do with his own hands on his own land, and just how to do it. Only when the work on each farm is intelligently adapted to all the conditions to which that farm is subject can the best results be reached."—James J. Hill.

THE FARMER DEMONSTRATOR.

A Means of Teaching the Farmer to Help Himself.

It is quite generally recognized by those who are working for the advancement of agriculture that the work of scientists, investigators and experimenters has made available a great body of knowledge applicable and helpful to husbandry. It is not overstating the case to say that if the knowledge actually in existence could be generally applied to farming operations in this country, it would place the industry on a basis of far greater profit, and readjust country life in all its aspects, placing it on a higher plane of comfort, culture, influence and power.

This fund of knowledge is being added to year by year; but it cannot be delivered to the people by written message in such a way that they will accept and adopt it.

We may investigate, and still further investigate; we may tabulate results, compile reports, and scatter them over the land, but the fact remains that they make but little impression on agriculture at large. This mode of instructing the farmer has been proceeding for years and has failed to bring about any general improvement. Only by personal appeal and ocular demonstration can the result that is sought be accomplished. Model Farms and Demonstration or Experiment Stations, while they are a step forward, do not fully meet requirements. They attract a good deal of attention locally, give useful and valuable information, but, like the printing and distributing of reports and bulletins, they do not reach the man who most needs them, and are too slow in accomplishing a general improvement. The results are not adequate to the expenditure of money and effort. A better means of reaching the backward farmer is needed. Has such a method been found? The co-operative demonstration work carried on in the South by the Bureau of Plant Industry of the United States Department of Agriculture supplies the answer.

This movement, which has assumed large proportions in the Southern States, had for its primary object the giving of immediate relief to the sections suffering from the ravages of the cotton boll weevil. The situation, when taken hold of by the late Dr. Seaman A. Knapp, of Texas, in 1904, was, to quote from the Year Book of the United States Department of Agriculture, "a very gloomy one. Cotton was the sole cash crop and was generally raised on what is known as the advance system." The small cotton planter obtained credit from the banker or merchant for the provisions and supplies necessary to maintain him and his family until his cotton was marketed. To do this, he gave a mortgage or lien on the crop, and often upon his team and tools. "At the end of the year the merchant or banker took the crop, sold it, paid the indebtedness for advances, and returned the balance, if any, to the farmer." Then the weevil appeared in state after state and destroyed the cotton crop. "Merchants and bankers refused to make advances, and the farmer found himself without credit, without food and without money. The result of this condition was a financial and agricultural panic. Labour left the country, farms were abandoned, stores closed, and disaster was apparent everywhere."

A system that would promptly and effectually meet this condition and relieve it was absolutely necessary. The department had investigated the boll weevil and was prepared to show the farmer how to produce cotton in spite of it. But this was not enough. The problem was twofold. The one-crop system was at the root of the trouble. The one crop system, whether cotton, wheat, tobacco, has proved a failure as a permanent system of farming. This is particularly true where the economic system tends to throw the crop on the market at a particular period of the year. Not only was this the case in this instance, but it had given rise to the credit system, under which all influences combine to increase the acreage of the one cash-crop, so detrimental to soil fertility.

To combat the weevil, a diversified system of farming was necessary. The cotton planter must be taught to rotate his crops; to grow corn, hay and forage for a profitable live stock industry, and with the aid of legumes and live stock to build up the fertility of his soil, while still growing cotton as a cash crop, but on a smaller acreage with a larger production per acre, and without having his financial condition dependent on its fluctuating price. The farmer must also be shown how to produce a great portion of the food necessary for his family. That was the problem; how was it met?

The system adopted to quickly carry the knowledge at the disposal of the departments to the individual farmer was as follows:—Competent local agents were employed to demonstrate to the farmer on his own land and with his own active co-operation the methods to be followed. Instead of having a single demonstration farm in a county, 25 to 150 demonstrations were carried on under the guidance of the department by a like number of farmers.

The important points in the system were:—

(1) Personal contact between farmer and instructor; (2) participation of the farmer in the demonstration; (3) the certainty of success, under normal conditions, of the methods advocated.

The local agent was required to be competent; not only must he have a knowledge of agriculture, but the experience to enable him to see the practical as well as the scientific side of the problems, and in addition to be a man of character, capable of securing and holding the confidence of the farmer.

The result was immediate and reassuring. The farmer-demonstrator raised cotton in spite of the weevil; at the same time he raised much more corn under the instruction of the demonstrator than he had ever been able to raise before.

"Seven years have brought a wonderful growth and many striking results. From a few agents in 1904, upwards of 600 agents were employed in 1911. From the instruction of a few farmers in Eastern Texas, the movement has extended to the instruction of practially a hundred thousand farmers, and from one state to thirteen states."

The work accomplished in arousing a general interest in the live-stock industry is one of the most important results of the movement. "Thousands of demonstrations in the raising of corn and forage crops especially adapted to the feeding of hogs and cattle and the introduction of permanent pastures for grazing, have opened the eyes of the farmers generally to the possibilities of the South as a live-stock country."

The work first influenced the individual, next the community, and finally the public opinion of the state. The third period of development has already been reached. Individuals, associations of business men, farmers' organizations and county governments are voluntarily contributing to assist the department in extending the work. For every dollar appropriated by Congress for its support, an equivalent amount is devoted to it from some other source.

Dr. Knapp once said that "the demonstration method of reaching and influencing the men on the farms is destined ultimately to be adopted by most civilized nations as a part of a great system of rural education."

OPERATION OF THE SMITH-LEVER ACT IN THE STATE OF OKLAHOMA.

The year 1914 marked the beginning of the operation of the Smith-Lever Act in the United States. Under this Act the Federal Government grants to the State Agricultural Colleges an annually increased sum to be devoted to Extension Work in Agriculture and Home Economics. Each state receives the sum of $10,000 annually as an unconditional gift. In addition to this, a sum will be distributed each year among the various States based on the ratio that their rural population bears to the total rural population of the United States. This further grant is made conditional on a like sum being appropriated by the State Legislature in behalf of Agricultural Extension. It is probable that, within a few years, $8,000,000 will be spent annually by the various States for the purpose indicated, aided by the Federal Government.

The text of the Act clearly indicates the nature and scope of the work when it says that it "shall consist of the giving of instruction and practical demonstrations in Agriculture and Home Economics through field demonstrations and otherwise" to persons who are not regular students at the State Agricultural College.

So far as agriculture is concerned the Act recognizes and is based upon the fact that right methods of farming can be ascertained only through scientific investigations, such as the farmer is not able to conduct for himself, but which are being conducted for his benefit by the agricultural colleges and allied institutions, and by the Federal authorities. These institutions are financed largely by Federal money. The Smith-

Lever Act grants the further aid necessary to enable them to carry to the farmer on his farm a demonstration of the methods and principles that have been proved to be most advantageous. In this way knowledge will be extended beyond the college to the man on the farm and the woman in the farm home, and to their sons and daughters who do not, or cannot, take advantage of the instruction given within the walls of the institution.

The report of the Oklahoma State Board of Agriculture of 1915 outlines the method whereby it is proposed to carry on the College Extension work in that State in compliance within the requirements of the Act.

As the work contemplated by the Act is in many respects identical with that being performed under the Agricultural Instruction Act, it is interesting and instructive to consider the plans being laid down for its furtherance. Before doing so, some consideration should be given to the system of agricultural education now being pursued and the equipment at the disposal of the State for this purpose.

In Oklahoma the system embraces the State Agricultural and Mechanical College and its related departments. This institution is the technical head of agricultural and industrial education. The Agricultural and Mechanical College is financed largely from Federal grants, there is no charge for tuition, and it is co-educational. The experiment Station attached to the college conducts experimental and original research work, and is financed mainly by the Hatch and Adams funds.

The Extension division of the institution is designed to instruct school teachers, children and citizens throughout the State in the best agricultural practice, in the industries and sciences and in home economics and home building. For students of the college who wish to qualify as Extension Workers and County Agents, a special five months' course is provided, embracing farm economics and marketing, agricultural engineering, agricultural chemistry, agronomy, animal husbandry, and other minor subjects having specific application to the work of Extension Specialists. After taking this course, they are required to act as Assistant County Agents during the summer months, returning in October to complete the two years' course. Students must have had four years' practical experience on a farm and be not less than 21 years of age.

The State Schools of Agriculture, six in number, are distributed over the State, and are equivalent to well conducted high schools. Their graduates are qualified to enter the Agricultural College. These schools are fully equipped and liberally maintained for the purpose of giving to boys a balanced education in all the practical duties of farm life, manual training being one of the important branches. Girls are instructed in the various phases of household economics and fitted to be wives of farmers. Farm demonstration work in all its important branches is fundamental. The school farms range in size from 80 to 160 acres.

The president of one of the schools speaks thus of the scope of the work: "The schools demonstrate for students and farmers cultural methods and the different kinds of farm crops, fruits and garden products; serve as testing stations; give demonstrations in road-making and farm management, and afford at a reasonable cost the best kind of educational training for boys and girls, turning back to the farms and into the farm homes young men and young women specially trained for the work that devolves upon farmers and their wives."

In addition to the schools of agriculture, the Legislature prescribes the teaching of agriculture and domestic science in the common schools.

The plans of the State Board of Agriculture for carrying on the work of instruction and demonstration in agriculture and home economics to be financed from Federal funds are systematic and clear cut. It was decided in the first place that the county agent should be the foundation of the extension work; that in each county there should be an agent working the year round with a woman agent assistant employed for at least nine months each year, the latter being known as County Home Economics Agents. The agents are representatives of the State Agricultural College and of the

United States Department of Agriculture. Through them will be carried on the various lines of extension work, and to their assistance will come, as occasion requires, the experts of both State and Federal Governments.

It is worthy of note that under the system that is being followed, the farmers are no longer required to assemble to receive instruction. Instead, the agents go direct to the farms, and are in daily personal contact with the farmers and their families. Every local problem is given personal attention, and in solving such problems the resources of the College and Experiment Station are drawn upon to the fullest extent. The women agents are no less busily employed in household economics. The extension division has in the field a woman who devotes her entire time to rural sanitation, showing how to make more healthful the surroundings of the rural home.

This consolidation of the Agricultural Extension work is under the supervision of an official known as the director of the extension division, with a corps of assisstants.

At intervals a movable school of instruction, to which specialists from the staff of the college and farm are attached, is held in different counties. For the boys and girls of the State, the extension division organizes and conducts demonstration clubs—corn, cotton and pig clubs for boys, canning, poultry and better bread clubs for girls. The club members are encouraged to exhibit at the fall fairs. Winners are given a free short course.

A large portion of this grant under the Smith-Lever Act is being devoted to meeting the needs of the women and girls on the farms, through women's auxiliaries and women's clubs. A woman has charge of the work under the supervision of the director. Home industries, as a source of revenue, are stimulated. Labour-saving devices, poultry-raising and dairying are demonstrated. Each girl member of a canning club is required to cultivate a garden of one-tenth of an acre, the main purpose being to produce a home food supply.

In Oklahoma the man who is doing the actual fighting in the trenches is the county agent, in conjunction with the woman assistant agent. The activities of the county agent directly affect every business enterprise in the State. Schools and churches flourish or decline as the people are thrifty or impoverished; the deposits of banks rise or fall as the farmers win or lose, merchants face profit or loss as agriculture expands or contracts, and the surplus products of the state are swelled or diminished as the farmer hits or misses his aim, thus directly affecting the earnings of transportation companies.

"There was a time," says the report, "when both the state and the federal government were maintaining separate departments for the demonstration of agricultural problems, each duplicating the other's work. Under the provision of the Smith-Lever Act, both are harmoniously united for the greatest possible service to agricultural life. Agricultural education of the right kind is the very foundation of the state's commonwealth, and should receive the intelligent support and encouragement of every citizen."

(NOTE.—The Director of the Agricultural Experiment Station of Oklahoma is Mr. W. L. Carlyle, B.S.A., a graduate of the Ontario Agricultural College, and a native of the province of Ontario. Mr. Sidney Carlyle, superintendent of Demonstration Farms in Alberta, is a brother.)

COUNTY AGENT WORK IN THE NORTH AND WEST.

(St. Louis Conference of State Leaders in County Agent Work, November 16-19, 1915. C. B. Smith.)

GENTLEMEN,—The purpose of these joint morning sessions, as I understood the matter, is to acquaint each other with the point of view governing our respective lines of work. The thought is that from this exchange of ideas and outlines of plans, worked out under different conditions, each may get suggestions of value in handling his own work, or at least, have a clearer understanding of the other man's point of view. In presenting to you the county agent work of the North and West I shall interpret my point of view in regard to that work as it has developed from the outset, and present to you, as nearly as I can interpret the work in many States, the thought of the leaders in the work at this time.

Organized co-operative county agent work in the North originated in this manner: In the fall of 1910 the Binghampton Chamber of Commerce, of Binghampton, Broome County, New York, conceived the idea that the farming surrounding that town was inadequate and poorly rewarded; land values were going down instead of up; the farmers didn't seem to have much money to spend; the city brought in much of its produce from outside sources. The Chamber of Commerce interested the railroad running through the town, and, together, they decided to put in a model farm that would be an example and inspiration to all the farmers of the vicinity. The assistance and co-operation of the State Agricultural College and the Office of Farm Management of the United States Department of Agriculture were sought for the purpose of selecting a farm and outlining the work that should be undertaken.

Professor W. J. Spillman, of the office of Farm Management, and some of his men, went up to look the situation over. Dean Bailey, of Cornell, and some of the professors of the college met them to look over and counsel on the matter.

Now this interesting situation developed: the U.S. Department of Agriculture had never done any special work in Broome County, New York, and really didn't know what was the matter with agriculture in that county. The State College of Agriculture had never made a study of the county, and really didn't know what was needed there.

The farmers were growing some corn: Should they be encouraged to grow more corn? They were growing some hay: Should they be taught how to double their yields? They were keeping dairy cows: Was dairying a good thing to urge on the farmers, with yields of crops and prices of milk as they were? The college didn't know; the Office of Farm Management didn't know.

The college and office agreed, however, that they did not want to father a model farm. They had learned that farmers do not flock to see model farms, and are not impressed with them when conducted by the State or Government. That much had been proved. The work in the South had demonstrated that the way to teach the farmer is to let the farmer do the work with his own hands, on his own farm.

But what particular thing should the college and department urge the farmers to do in Brome County, with their own hands, on their own farms? The college didn't know; the department didn't know. They finally agreed that the best thing to do under the circumstances was to engage a man competent to study the situation and, based on the results of his studies, take up such lines of agricultural importance as would seem best to meet the immediate situation and the needs of the farmers.

The college, having no funds for the co-operation, agreed to lend its moral support to it and find a man for the work. The Office of Farm Management at Washington, the Binghampton Chamber of Commerce, and the Delaware, Lackawanna and Western Railroad, jointly financed the work. In the project agreement drawn up the super-

vision of the work was left to the college and the Office of Farm Management, jointly. The college practically turned the matter over to the office of farm management. The office, without experience, practically left the matter to be worked out by the agent himself.

The agent went to work March 11, 1911, and this is the beginning of organized co-operative county agent work in the North and West.*

I desire to get clearly before you now the difference in viewpoint, as I see it, of the county agent work of the North from that of the South, at the inauguration of the work, and some of the reasons for that viewpoint, also such modifications as may have developed as a result of experience.

The agent of the South, when put to work, had a definite programme mapped out for him. The staple crop of the region, cotton, was threatened with the boll weevil; it must be saved, or, in lieu thereof, other crops substituted, of which the farmers had had little experience in growing. The farmers needed to be shown. The agent's job was mapped out for him; he was closely supervised.

On the other hand, the agriculture of the North was much more diversified. The farmers knew how to grow, and were familiar with many different kinds of crops, crop rotations, and live stock. No dire calamity threatened the industry or any large part of it. Inadequate returns were being secured by some farmers, and in some instances this might be quite widespread, but in practically every community examples could be found of very thrifty farmers and very satisfying systems of farming. In the North the immediate matter did not seem to be so much one of the agent's doing specific demonstration work, as it did in pointing out the good examples of farming already in existence, and getting these good practices established among all farmers.

To amplify this thought a little, it may be stated that in every county of the corn belt, for example, probably a hundred farmers can be found who can grow and are growing as good corn as can be grown probably by any agent either the State College or the Department of Agriculture has in its employ. The same is true, in a broad way, of wheat, potatoes, hay, the handling of hogs, dairy cows, etc. The farms of these men are already successful demonstration farms, developed there in the community, and immediately available for demonstration purposes.

The more the matter was studied, and the more facts regarding the agriculture of any particular locality were ascertained, the more certain became this fundamental truth of northern and western agriculture and which now forms the basis of much of our county agent work; namely: Every community where agriculture has been going on for any length of time has worked out, by a few individuals within it, good systems of farming. These systems are good enough so that if the average returns of the whole number could approximate what 20 per cent of the farms are actually doing, the county or community would be unusually prosperous.

The big work of the county agent of most sections of the north and west would therefore seem to be to help the community discover itself; to show the community what the community itself has already accomplished; to hold fast to the things that have proved good; to point out defects when found; to introduce new methods, new crops, new industries, if needed, but to begin with what the community has already worked out itself.

This plan, you will see, implies that the county agent has the ability to analyze conditions, to find what factors are making for the building up of agriculture in the

* Some unorganized County Agent work was begun in Bedford County, Penna., by A. B. Ross at Shellsburg about the year 1906. On March 1, 1910, Mr. Ross was appointed as agent of the Office of Farm Management, but without local or State financial co-operation. At that time Mr. Ross was carrying on demonstration and advisory work with about 200 farmers in two or three counties.

In the Province of Ontario, District Representatives were first appointed in 1907. See Report of Agricultural Instruction Act, 1913-14.

community. His guess is not sufficient. A constructive programme of betterment depends upon a knowledge of the facts as they are found right there.

Shortly after the county agent work started in Broome County, New York, a large commercial concern, benevolently inclined, learned of the work. The idea of business men and Chambers of Commerce taking an active interest in agriculture appealed to it, and $100,000 was set aside to aid in that work, with the hint that a million dollars would be available, if necessary. This was to be used at the rate of $1,000 per county, for counties that would organize in support of the work for two years. The money was expended through the Council of Grain Exchanges of Chicago, with an energetic agent in charge of it. A wide and active campaign followed for county agent work. It was comparatively easy to interest Chambers of Commerce, bankers and business men in the work. The idea of being of direct service to the farmer appealed to their imagination. Through this work they saw an opportunity to get into more harmonious relations with farmers. Besides, in building up the agriculture surrounding their town, they felt that business would be benefited almost in direct proportion as the farmers had increased funds to spend. The immediate effect of this was that Chambers of Commerce, bankers and commercial men in many sections of the north and west largely led in the organization of the work.

It was practically a year and a half after the first county agent was located in Broome County, New York, before the Office of Farm Management had funds for expanding the work. At that time the states had practically no money for this purpose, the Office of Farm Management had approximately $65,000, and the Council of Grain Exchanges had $100,000. It was our task to keep in sight of the rapid campaign that followed for county agent work throughout the entire north and west, to effect co-operative relations with each county that organized, whether we had any money to put into it or not, and to see that the Agricultural Colleges were systematically brought into the co-operation and assumed joint responsibility with the department for the supervision of the work.

It was a new work. Neither the Office of Farm Management, nor the colleges, had had any experience in organizing such work. It did not appear to us at that time practicable to organize the work on the plan of the South. More local control, less direct supervision on the part of the department, greater freedom of action on the part of the agent in shaping up his work, all seemed essential.

With the funds of the Council of Grain Exchanges, as well as those contributed by bankers and business men, given directly to the county organizations, and with the work largely fathered by business interests, the work savoured decidedly of city influences.

The first intimation that something might be wrong in this plan came from a county in Michigan. The Board of Supervisors of the county had been asked to contribute county funds in support of the agent. Instead of doing so they presented the matter to the people for a vote. The farmers voted decisively against the county agent plan. This was a shock. A like result followed in a few counties elsewhere over the country. About this time we learned that the farmers in Broome County, New York, were interested in seeing how the business men were going to teach them farming, and their attitude was typical of farmers in some other counties. In other words, when we had time to take stock of what was really going on, we found that the farmers regarded the county agent movement largely as an outside movement, something not their own – a business man's or city proposition, something for which they were being assessed by county tax but for which they did not ask, nor were they in any large way consulted.

Gradually it dawned upon all that the matter had been gone at more or less backward, that instead of the business men leading, with the farmer more or less of a silent partner, the farmer himself should lead, with the commercial interests the silent partner.

This idea has seemed to be sound. Today practically no county is organized anywhere in the north and west until after the work has been fully explained to the farmers, and they have signified their interest in the work of organizing for it and asking for the co-operation of the State and Department in the employment of an agent. This puts the farmers squarely behind the movement. It makes it their work. Business men are invited to take part in the work, but the farmers hold the offices and are responsible for the organization and policies.

Before I leave this phase of the subject, however, I desire to add this acknowledgment. We largely owe to business interests the rapid progress of the county agent movement in the north and west. Through their aggressiveness the work was initiated on a large scale and forced upon the attention of the Agricultural Colleges and Congress. But for their interest in the work, the Smith-Lever Act, I am convinced, would have been greatly delayed in coming, and notwithstanding the fact that funds are now practically assured for an agent in every county of the north and west, we still need the stimulating, helpful interests of business men in the work, and it would be a mistake not to make use of this force, so generous in its assistance. We need their co-operation—but the farmers must retain local leadership and direction of the work.

The county agent idea has now been accepted by every one of the Northern and Western States as an essential part of any effective extension system. The movement has not developed on a uniform plan in the different states. The Office of Farm Management of the Department, while having a fairly well formulated plan of its own for the work, nevertheless had no large amount of money to put into it. In every case the work was co-operative, the co-operating parties usually contributing one-half to three-fourths of the funds, and in approximately 30 per cent of cases the local county organizations contributing all the funds. The kind of work that should be undertaken in any county, therefore, and the way in which the work should be conducted, was more or less of a compromise.

A fundamental idea of the Office of Farm Management with reference to the work and what that office tried to inject into the work in every State was this: First, find out what the farmers need. Second, give the farmers the kind of assistance that will best meet their need; for it must be remembered that of all the States of the North and West there was just one (Illinois) where the State Agricultural College had worked out a clear-cut definite scheme for improving the agriculture of the State, and was ready to stand behind the plan in any particular county. In that State each Agent started out with "Lime, Raw Rock Phosphate, and Clover," as a slogan. In practically every other State the problems of each particular county were in a large measure not worked out, either by the State Agricultural College or by the Department at Washington, and that is largely the situation today, and particularly is this true of the west, with its problems of irrigation, drainage, alkali, dry farming, markets, and many other things, where many of the colleges as yet are unable to offer any clear cut programme for county wide agricultural improvement.

Putting upon the county agent, therefore, the burden of diagnosing conditions, of organizing his work to meet those conditions, and of doing such forms of extension work from the outset as would meet the expectations of the various co-operating parties employing him, called for men of unusual training and ability. From the outset, therefore, practically only men trained at an agricultural college and familiar with practical agriculture from childhood, with a record of successful work behind them, have been employed as county agents. The cost of a county agent in the north and west for the past year has averaged approximately $2,900 per county for salary and expenses.

With the starting of the work in many States widely scattered and by many agencies, and with the administration of the work, both on the part of the States and the National government, necessarily entrusted to men largely drawn from the research forces of these institutions, and without experience, the wonder is that the movement succeeded. But it has succeeded and I attribute this success largely to the adaptation of

the work to the needs of each community—as locally determined, and to the quality of the men employed as agents. I don't suppose a stronger group of agricultural men has ever been assembled in the United States than this group of county agents, who, with consciences quickened and the spirit of the pioneer within them awakened, have felt their responsibility in the work and have met it.

Through it all the aim of the Washington Office has been to keep in touch with the work in every State, insofar as its limited force would permit, and through a system of annual conferences such as this, at which the leaders of the work in each are assembled to sift out the essentials, as they appear from year to year, and get them gradually adopted, insofar as they may be applicable, in each state.

With this setting forth of the origin and development of the work, we are now ready to take stock and see how far we have advanced. As I am able to sense the matter the best thought on the county agent work of the north and west at the present time may be summed up as follows:—

1. The county agent of the north and west is essentially an organizer and administrator of all the extension forces operating within the county for the purpose of increasing efficiency and profitableness of farming.

2. The best county agent work in the north and west to-day is being done in those counties where there is a county-wide organization of farmers behind the work, with numerous subsidiary branches throughout the county.

3. The county should be well organized and the work of the agent clearly explained, and a large body of farmers thoroughly in sympathy with the work, before an agent is placed in a county. The idea is that farmers are not being shown; they are associating together and teaching themselves aided by paid leadership.

4. A county-wide organization is of little value unless the agent and farmers use the organization.

5. Farmers learn as they do for themselves; not as they have things done for them.

6. The programme of work of the county agent therefore should be formulated in conference with the farmers themselves.

7. The work of the county agent should be definitely drawn up on a project basis, the farmers, the agent, and the college all agreeing on the programme.

8. The county agent is the direct representative of the agricultural college and the United States Department of Agriculture, as well as a representative of the county organization. Through him, or in co-operation with him, all State and Government extension work should be carried on within the county.

9. The agent's big field of work is that of a demonstrator, but he deals with individuals in this work only as they represent groups. Field meetings on the demonstration plots are an essential part of practically all demonstration work.

10. Demonstrations are essentially of two kinds:—

(1) The kind the agent finds already worked out by successful farmers when he takes up work in the county. Upon these hinge practically all of his other demonstration work. These give the county agent the clue as to what is right in agriculture in that community.

(2) The kind the agent places himself and either directly or indirectly supervises. These give the farmers confidence in the agent's practical knowledge of agriculture, and constitute centres of community meetings and influence.

11. Upon taking up work in a county the agent needs two programmes: One to meet the immediate expectations of those co-operating in his employment, and which shall inspire confidence in farmers as to his practical knowledge; the other a permanent programme designed to effect fundamental improvements of the agriculture of a county.

12. The best means yet found in the north for assisting the county agent in formulating his permanent programme of work within the county is through farm management demonstrations.

Since this phase of the demonstration work in the north and west is of comparatively recent origin, I may add a word of explanation in regard to it.

At the inception of the county agent work in the north, the Office of Farm Management at Washington planned on having the agent, immediately upon taking up work in a county, make a diagnosis of local agricultural conditions, based upon which he would work out a constructive programme of agricultural betterment.

In this plan an important matter was overlooked. Practically no one had been trained in, or knew how to do, that kind of work. This, together with the necessity of adopting a compromise programme because of the financial and other co-operative relations involved, made it impracticable to carry out that programme, except in a few cases. The results obtained in those few cases, however, were most illuminating, and based upon the results secured by one agent, Mr. G. P. Scoville, of Chemung County, New York, the consent of the Secretary of Agriculture was secured for organizing a special force of men to bring to county agents, generally, first, the significance of the agents having a knowledge of the facts of local agriculture as a basis for extension propaganda within the county, and, second, how accurately to diagnose local or individual conditions, and to do this through a concrete demonstration with a small group of farmers within the county.

This supplement to county agent work in the north is yet very new, though considerable importance is now attached to it. It has been in operation only a year and a half, during which time it has been necessary to assemble and train a special group of men, now numbering twenty-five. In this time, however, 140 county agents have been assisted and instructed on how to diagnose conditions on the individual farm or in a community and, in co-operation with them, over 10,000 demonstrations with individual farmers carried on in groups of about 70 farmers each, located in about 140 counties in 22 states.

In this work, instead of putting emphasis on the yield of crops, the emphasis is put on a larger net income at the end of the year. Instead of starting a man off at high speed on some particular phase of his farming, like corn-growing, it emphasizes the right organization of the farm first, with a speeding up on such details as the farm diagnosis shows need speeding up. Instead of asking a man to undertake a piece of farm work blindly, he is given a vision of his whole farm, with the relation of its parts, and emphasis placed on what must be done fundamentally if success is attained.

I shall not go further into detail with regard to this at this time. The leaders from the north and west are all familiar with the work, and if the matter is of any interest to the south or others I shall be glad to explain the work further, either individually or collectively.

I may draw your attention, however, to this chart, which shows, in a skeleton way, the work done in 49 areas in 17 states, since it brings out strikingly that interesting fact in northern and western agriculture, that every community has worked out good systems of farming, which constitute immediate demonstration material for a county agent, if he knows how to find it. This chart shows that in these demonstration areas 20 per cent of the farmers are making approximately $1,000 a year more than the average farmer of the same county.

Is the county agent work in the north and west making good? We feel that it is. On July 1, 1912, there were three county agents in the whole north and west. A year later there were 140; on July 1, 1914, there were 230, and now there are 383. Out of this number starting work in 32 states, under all kinds of co-operative organizations, with all kinds of supervision and no supervision, and under all kinds of conditions, less than 5 per cent of counties started have failed to maintain the work. With so

many co-operating parties usually involved in the work of each county, and with the purpose of the work only partially understood, this is a much smaller percentage than we can hope to maintain. Most of the cases of failure thus far have come from using unqualified men or because the purpose of the work was not well enough understood by the farmers to secure their support.

The character of the work the agents have been doing may be briefly mentioned. During the year ending June 30 last, 260 agents carried on a total of 35,000 demonstrations, 30,000 of which were in connection with crops and 5,000 in connection with livestock and farm organization. During the calendar year 1914 covered by the annual report of the agents, 261 agents reported visiting 76,291 farms in connection with their work. This is less than 300 farmers per agent and is significant of the small number of men who can be reached individually by the agent. The number of farmers who visited the agents or the Farm Bureau office as a place of consultation and conference is an indication of a wholesome tendency towards making the Farm Bureau a clearing-house for agricultural information. Eighty-seven thousand and ninety such calls were made and 161,320 telephone calls on the agent in regard to some farm problem. The agents wrote 274,956 letters and addressed meetings with a total attendance of 419,430; also 4,613 schools were assisted in developing agricultural instruction.

In relation to farm and farmstead: Silo construction, particularly in the middle west, has been greatly stimulated. One hundred and forty-six agents have been instrumental in securing the erection of 4,017 silos; 731 drainage and 129 irrigation systems have been planned. Along the lines of home conveniences, 73 agents report 147 water supply systems as being introduced through their suggestion.

In relation to crops: One hundred and nineteen agents report 596,194 acres of corn planted with tested seed. Sixty agents who conducted tests report an average increased yield per acre of 9·3 bushels on farms following agents' advice. The grain smuts, particularly the oats smut, have been a serious problem in many counties of the middle west. Ninety-nine agents report 7,040 acres of oats grown in demonstration fields, illustrating the benefits of treating seed with formaldehyde. In fields where careful tests were made, the increased yield as a result of treating seed in this manner was from 5 to 12 bushels per acre, at a cost of from two to three cents per acre for the treatment. Seventy-six agents report 277,780 acres of oats as being grown under their direction. Forty-eight agents report an average increased yield per acre of 10·6 bushels. One hundred and five agents report 265,450 acres of wheat grown under their advice. An average increased yield of 7 bushels per acre reported by 54 agents is the result of definite tests. Ninety-one agents gave advice in regard to the planting of 17,609 acres of potatoes. On demonstration plots where yields were determined, 47 agents report an increased yield of 26·6 bushels per acre. One hundred and ninety-four agents influenced the sowing of 85,257 acres of alfalfa. For the most part this was in connection with introducing alfalfa in the localities where it had not previously been commonly grown. The value of soil inoculation in connection with alfalfa seeding was demonstrated on 7,549 farms.

Work done in relation to live stock: Work done in the introduction of pure-bred sires and their transfer from one community to another has been an important phase of live stock work. One thousand nine hundred and forty-one registered sires were secured for farmers and 423 transferred from one community to another; 3,121 dairy cows were purchased by farmers on advice of county agents; 2,322 animals were tested for tuberculosis, and 291,905 hogs were vaccinated for hog cholera. In connection with the hog cholera control work, several of the agents have thoroughly organized their counties by school districts into anti-hog cholera clubs. Every outbreak of the disease is promptly reported to the county agent's office. The organization of these clubs has resulted in a stricter enforcement of state sanitary laws and made the isolation and control of the disease a much easier matter.

Work done in relation to fertilizers and fertility: One thousand nine hundred and eighty-six farms were instructed in the home mixing of fertilizers; 11,552 farmers conducted demonstrations in regard to the use of lime; 287 local sources of lime were developed. The use of cover crops and the value of legumes in soil improvement was given much attention.

Work done in relation to farm business: Two thousand and seventeen farmers were helped to keep farm accounts and 3,437 farm analyses made. Seventy-two farmers' exchanges were organized doing a business of $93,846. These same exchanges supplied 2,333 farmers with labour. The total business done by purchasing and marketing associations organized by the agents amount to $1,236,023, resulting in an approximate saving to the farmer of $96,400. The above are illustrative of a few of the more important activities of the county agents. Each agent makes weekly, annual and semi-annual reports to this office covering every phase of his work. With the development of the written project it will be possible to give more specifically the result of demonstration work.

Will this county agent work be permanent? We think so. Funds for the work under the provisions of the Smith-Lever Act are available and the colleges and Department recognize the system as the best means yet devised for carrying their message to the last man on the farm. With these two parties practically of one mind as regards the county agent work and system and with the farmers behind the movement, there would seem to be no hitch in the plan, provided, always, that the quality of men and work that is now in effect is maintained or improved.

APPENDIX D.

WOMEN'S WORK.

THE CASE OF THE WOMAN ON THE FARM.

The Secretary of Agriculture of the United States sent out recently a circular letter to the farm women asking for suggestions as to the ways in which the department could work for their benefit. The replies received during the year bring into prominence the difficulties and disadvantages of farm domestic life and emphasize the needs of farm women.

Perhaps the most striking note is the demand for fuller knowledge—knowledge that will enable the women to make their homes healthier, their lives brighter. While it is clear that farm women want to learn, that they want to improve their homes, it is equally clear and frankly admitted that to-day they don't know how. Those who do know want their husbands to be told also.

The demand is strong that practical information be brought to them through the medium of ocular demonstrations, either in their own or their neighbours' homes, through lectures, through bulletins, educational moving-pictures, through anything and everything, in short, that will bring home to the people the possibility of better living.

The farm woman looks not only for help in her work, but for aid in finding pleasure and diversion outside of her work. In this regard it is not so much material assistance, such as libraries, instructors and meeting places, that are needed, but leadership in organizing to obtain for themselves these and other aids. In the organization of women's clubs and co-operative societies, government agents should it is claimed, be the leaders.

Overwork is the common and widespread complaint. The farm woman can get no help for herself, and the help her husband has she must care for. Lack of modern labour-saving devices, of proper heating, lighting, water and sanitary systems add to the burden.

The complaint is very common that attention has been concentrated on improvements in agriculture, while the development of home and social life has been neglected. Progressive farmers thoroughly understand the value of scientific care of live stock, but give no thought to conditions in their own homes; barns, wells and stables are planned with a keen eye to minimizing labour, but no attention is paid to the waste of labour indoors. The farmer invests capital in his farm; it does not occur to him to invest capital in his home. It simply does not occur to him. He does not realize that the house as well as the farm is a business, the management of which may be either progressive or antiquated.

To-day the farm woman is striving to do her work with the same equipment and with less help than her grandmother had. The ease of living elsewhere draws away those from whom she might otherwise obtain assistance. As labour has become scarcer and more expensive the farmer has been aided with information about labour-saving devices and systems of management. His wife asks for similar assistance.

While it is generally recognized that whatever benefits the farmer benefits them, to many the direct benefits are not readily apparent. Prosperity and enlarged farm operations not only fail to bring relief, but rather the reverse. Abundant crops need hands to harvest them, and the farm woman must feed the hands. To many this is the last straw. Already overdriven, they object to having this additional burden

thrust upon them. Efforts to promote dairying and poultry raising are often regarded with disfavour, for when the men are fully occupied with the work of the fields, on the already overworked woman must fall the burden of caring for additional cows and chickens.

Being employed incessantly with routine tasks, the farm woman is confined to the home. She has few social opportunities, and improvement and development for herself and her children become difficult. To this condition is largely due much of the isolation and loneliness complained of.

It is urged that the better distribution of available labour combined with a diverting of the stream of immigrants from the city to the country would assist in remedying some of the drawbacks of farm life. The establishment of co-operative laundries, bakeries, butchering and canning plants is also advocated.

For their children, women demand preparation for the practical aspects of life. It is argued that under the present system, schools educate the young away from their life work. Those seeking a higher education can obtain it at present only in towns, where they quickly lose all sympathy with farm life. To remedy this, many look to the establishment in rural districts of what may, for want of better name, be termed agricultural high schools. Such schools should provide instruction in Agriculture and Domestic Science. The importance of domestic science is dwelt on particularly as the only remedy for this tendency on the part of girls to depise all housework, as a species of degrading drudgery. This attitude makes them not only inefficient but unwilling as well. With greater knowledge would come greater satisfaction in the performance of their duties.

Agriculture is the meeting point of many sciences. So also is home-making. For both scientific education is necessary. And to consider one without the other is to have a one-sided development. It is useless to educate the farm boy to be a better farmer, to apply principles of science and business to farming without a corresponding education of the farm girl in the principles underlying home-making.—*Co-operation in Agriculture.*

NOTES ON WOMEN'S INSTITUTE WORK.

Ontario.

The president of the Thunder Bay District, Mrs. D. J. Piper, in her address at the district annual meeting, held in June, pointed out "that, as women who are not found at the institute must be reached in order that they may be taught to be practical and efficient, the Government will be asked to appoint a woman as district representative, just as a man is appointed to instruct the men, whose duty it will be to visit the isolated homes and to teach the women and daughters in order that their highest work in life, that of home-making, be not ignorantly undertaken. Greater efficiency will surely bring about better conditions for the farming community of the district, and the results will justify the expenditure for the salary of the resident instructor."

The four weeks Domestic Science course, given under the auspices of the Women's Institute at Aylmer was exceptionally successful. At the first forenoon session more than forty girls were present, and in the afternoon as many as one hundred and fifty women.

Prince Edward County has eleven branches, each linked with the other. All hold monthly meetings, and unlimited is the scope of their subjects. Each take up needed work in their locality; one, a park; one, the school; one, the cemetery; one, school fair, etc., and all, the Red Cross work, Belgian work, etc. As they were thoroughly organized, it only needed the stating of the need to meet with hearty co-operation.

"Woman, through her keeping of the 'Home and Country' motto, is learning many things, not the least of which are the sharing of her advantages with the one next door, the reaching out the helping hand to others, and learning of many things from those she meets, with the result that brightness comes to her own hearth and radiates to the extreme end of her locality, of her county, of her country—yes, and beyond."

"At the beginning of the year it was suggested that we build a Women's and Farmers' Institute Club Hall and in one week the Women's Institute Committee had collected over $500 in money, lumber and labour. Since then we raised $40 by a small box social, for the hall. On July 1st, the Women's Institute served a dinner, supper and midnight supper and gave a dance from which we received $62. This summer we have had two 'bees,' and the hall is now in process of erection. We hope to be able to use it this winter and finish it by degrees.

The building is 24 x 60. There will be a committee and reading room with folding doors, which can be opened into the main building. There is also a kitchen attached. We hope in time to have the grounds fenced in, with a lawn, flower beds and a tennis court. Later we expect to build a drive shed.

This winter, if possible, we shall have the reading room heated, and supplied with magazines, to be used as a rest room by members from a distance who come to shop. The young people will also have some place to go in the evenings, and we may get some games. We hope to have lectures and concerts, etc. It will be such a boon to this community, and the population is increasing so rapidly that we thought it better to build a large hall to provide for the future."—Hymers' Branch.

"Friday was a 'red letter day" for the Whitby branch of the Women's Institute, in that on that day the new rooms in the Agricultural Department's building, to be devoted to the women's work, were opened. The ceremony marked a distinct step in advance for the Institute. For a considerable time, the lack of sufficient accommodation has been a serious handicap to the ladies in their endeavour to render efficient service along the various lines of their work. The new rooms fill the requirements perfectly. They offer a splendid meeting place, and the kitchen in connection makes possible the carrying out of a great deal wider programme along the line of demonstration. The rooms also afforded the Institute the means of providing a rest room for women who may be strangers in town, where they may rest, read and write and make themselves at home. All were deeply impressed with the value of such a place in the life of the community."

"Nearly a year ago a number of the ladies of the Tillsonburg Women's Institute decided that the teaching of sewing to the girls in the Public School would be a helpful mission that they might undertake with great advantage to the pupils, and after an interview with the School Board, who readily gave their consent to the scheme, the work was started, under the supervision of the President. Since then plain sewing has been taught along the lines authorized by the Education Department."

"The members of the Sleeman Branch, in the Rainy River District, go in relays each month to clean the school. This Institute is agitating for better school equipment and grounds, and wishes to make the school the social centre."

At the annual meeting of the Lincoln Women's Institute the delegates decided in favour of a campaign in that district for the representation of women on the Public School Boards.

The Rothsay Branch has given a drinking fountain to the various schools in the community.

The Mount Brydges Institute has a school committee which visits the school each month and reports at the Institute meeting anything needed. This Institute also takes great interest in the school garden and fair.

"We have bought seventy-five pounds of dynamite with which to blow out the stumps on the school grounds, and ordered paper to paper the school."—Kingsford East—Rainy River district.

The Erindale Institute (Peel) is taking an interest in school work and is agitating for a larger teaching staff.

"After using the travelling library for twelve months, the institute decided to have a public library and at one of the regular monthly meetings opened a subscription list and raised over $50 for this purpose. An additional amount was raised in several ways, and early in the summer a public meeting was called and the public library organized. They now have 362 books in circulation. In November last, the institute arranged for medical inspection in the school, and they learned that inspection is quite as much needed in the rural schools as in the city. The members are hoping for a continuance of this work."—Beachwood Institute.

"I don't see how we could do without our Women's Institute, and any town which has not a band of these enthusiastic women is surely to be pitied. When we were all plodding through mud over our boot-tops and everybody growling about it, but making no effort to remedy the case, our institute took up the matter, provided material, and before long we had a sidewalk from the post office to the station; and again, when the schoolhouse was badly in need of a cleaning and no one could be found to do the work, along came our Women's Institute with pails, brushes and soap, and did the school up in first-class order."—Earlton Institute.

British Columbia.

"Co-operation and public spirit were exemplified when, under the auspices of the Women's Institute the farmers and residents of the Matsqui dyking district reconstructed a stretch of road that for a long time had been impassable. This road is the main thoroughfare over which the farmers convey their produce to the C.P.R. station, and as funds were lacking for its construction, the members of the Women's Institute organized a village improvement day and their call was answered by the farmers within a radius of three miles of the village. Sixty-five teams were put to work early in the morning hauling crushed rock from the government bunkers at Gifford, three miles away, and about one hundred men in all worked throughout the day on the road. By night just 140 loads of the road material had been hauled and put in place. The Government donated the crushed rock, also supplied the roller and sprinkler. Four horses were hitched to the roller and as fast as the rock was levelled off it was rolled.

An excellent dinner was served in the Women's Institute building by the ladies, and music was furnished throughout."—Matsqui, B.C.

"A working bee was held in the school grounds during June in order to clear a portion of the yard as a picnic ground. Thirty-seven men gave their services for the day, and much was accomplished. It is to be hoped this clearance will lead to the organization of school gardens at no distant date. The members of the institute showed their appreciation of this voluntary aid by furnishing a hot luncheon and a good supper to those who gave their time to this excellent object."—Langley Fort, B.C.

"The West Summerland Institute has taken the lead in submitting plans to assist members towards getting into touch with the institutes of Manitoba and Alberta for the purpose of marketing fruit from the Okanagan Women's Institutes, and they hope to make these plans workable before the fruit season comes on. At the February meeting the importation of apples from the States to Nelson was discussed at length, and the members pledged themselves to refuse foreign-grown apples, when it was possible to procure the local fruit, even when such home-grown apples should not be of as good quality, provided that the price of the local article corresponded to its quality.

"The next topic discussed was the local market, and Mrs. J. Johnstone was delegated to attend the city market that evening to ask its co-operation in appointing a board of control, composed of two business men of the city, two ranchers and two women, with the mayor at the head. The question of proper weights, revision of prices and the supervision of the market will also be dealt with."—Nelson, B.C.

"Our institute took charge of the women's and children's section at the fall fair and offered prizes for children's exhibits of flowers and vegetables."

"A magazine club has been started in connection with the institute for the settlers in Steel Head Valley, a new district opening up about seven miles away."

"The City Beautiful Committee reported on saving a fine tree from being cut down, and suggested that the council be asked to prevent the cutting down of trees that were sound and which did not interfere with property."

"The Kalso jam factory was started in 1913 to help preserve the surplus of fruits and encourage the manufacture of home products; $200 was received from the sale of these during the past year."

Nova Scotia.

"At our April, 1914, meeting the president called for suggestions as to special work to be taken up by our Institute. When these were given it was found that the one which appealed most strongly to the members was that we secure some place in which the young men and boys could spend their evenings. Also that we secure a permanent place in which to hold our meetings and that we start a small library for the Institute members."

"Space will not permit us to speak of all the work we did that summer—how we secured a site, how the men helped with money, labour and teams; but as a result of all this labour we will simply say that on October 1st our W. I. meeting was held in a room especially built for our use in a fine new hall, which also contained a gymnasium, a reading room, and a game room, the idea being to make it so attractive that the boys will not wish to loaf around the streets. On this day also we had awaiting us one of the McGill travelling libraries.

"Before the opening of the hall we had begun doing Red Cross work and up to this date have spent about $250 for materials and have sent forward four shipments of supplies. This winter the Citizen's Hall (as our building is called) has been the social centre of the community. In it have been held concerts, parties, lectures, etc. The young people have also enjoyed their basket ball, and skating as well, for we have a rink on the hall grounds. In the summer we hope to have these grounds prepared for ball, tennis, etc. We are only beginning to see what may be done by a band of women earnestly endeavouring to help as much as possible their community and their country."—Port Williams, N.S.

"The exigencies of the times have made Red Cross work our principal undertaking, and into this work we have entered heart and soul. Finding our funds somewhat low, we had a chicken supper, which netted us $100. This money we are laying out in yarn, flannel, etc., and at a weekly sewing and knitting society we are manufacturing the material into finished garments for the soldiers. When our $100 is spent, we shall raise more, for we are determined to sew and knit—knit and sew—just so long as our brave soldiers need our help."—Round Hill Institute.

New Brunswick.

"A committee was appointed to find out, if it were possible to rent the Temperance Hall for the purpose of providing a permanent place of amusement for the young people of the community. Great hopes are entertained that money will be donated or raised in some way to establish a gymnasium and reading room for the winter months and a tennis court for the summer and fall months."—Lorneville Institute.

"Surely it must have made the members of the Hartland Institute feel anything but downhearted to read the following item taken from their weekly newspaper: "At last Hartland residents are privileged to traverse the streets at night without danger to life and limb. For a long time the men of the place have complained of the darkness and discussed various plans to light the streets, but nothing ever came of it. Then the Women's Institute took the matter up and as a result there are now several gasoline lamps, attached to telephone poles, in positions where most needed, and the streets are well lighted."

"The women from the country recently received a surprise at the Ladies' Waiting Room in the market. The Fredericton Institute placed stationery and magazines in this room, and hope before very long, with the co-operation of other branches in York County, to establish a Rest Room for the benefit of women from the surrounding country."

"Nashwaaksis Institute 'Girls' Meeting' was voted the best meeting ever held by that Institute. At this meeting the Chairman of the School Committee reported having bought and placed in the schoolhouse two sanitary water-coolers."

"The Woodstock Institute recently held a successful 'Clean-up Day' about town, were ably assisted by the Boy Scouts."

"Hammond Vale and Markhamville Institute has put a hardwood floor in the Markhamville school-house at a cost of $40. The Hammond Hall has also been improved by the Institute, the inside being sheathed and the outside painted at a total cost of $100."

"Clifton reports an interesting meeting for October. Papers were read on 'Where Home and School Meet' and 'How Women Working Collectively and Individually May Help the Public Schools.' A committee was appointed to arrange for a Fair for the children of Kingston Parish Schools at Kingston, when all might exhibit products grown in home plots, household science work, etc."

"The Fredericton Branch, in carrying on its 'Civic House-cleaning Movement,' has appointed committees to see that bakers wrap their bread in a sanitary manner, and the garbage pail question is being investigated."

"Dalhousie Junction Institute members have bound themselves to complete one hospital garment each, every week."

"The Dumfries Institute is succeeding in getting the young people interested in the work. The Institute cleaned the school-house in the community, and put up window shades and pictures, making the room in every way attractive."

"Throughout the summer months the Institute held a series of picnics for the school children, when they worked in the school gardens under the direction of the teacher. This Branch is also cleaning the grounds about the station—which is in the centre of the town—and making it into a miniature park, by planting trees and flowers and placing seats."

"The money now on hand for the motor ambulance totals $1,727.72. It has been thought advisable to add an extra wheel to the ambulance and sufficient money is now on hand for that purpose."

PRINCE EDWARD ISLAND.

"A little over a year and a half ago when the Women's Institutes were organized in this province and this new-found economic power was recognized, it was wondered by some what the outcome would be. Among some the first thought was that these institutes were merely a fad; that they would continue for a time only. This thought has been answered—and answered in no uncertain way, for the work has spread rapidly and now reaches from Summerside, in the western part of the Island, to East Point, in the eastern section.

"This great movement is not a passing organization; it is a work representing a great economic force. The Women's Institutes are opening up a new era in the life

of housekeeping, for which the women of the generations to come will ever be grateful. They are improving our schools and school grounds, they are instituting libraries, studying kindergarten methods, music and art, planning to have courses in sewing and home nursing and short courses for the introduction of manual training and household science courses into the rural school curriculum.

"One of the most pitiful things about the situation of sanitation is the indifferent acceptance of conditions by people generally. It is safe, however, to predict that the sanitary conditions of the rural schools and homes will be numbered among the list of improvements. The proper arrangement, equipment, lighting, heating, ventilation, toilet facilities, playground and physical care of a rural school are within the reach of almost any community, however poor, providing the necessary information finds its way among the people.

"For years the rural population has been trying to help in the solution of problems peculiar to their communities, and the difficulty perhaps has been to get the parents of children attending school to do their share. Now one of the most important phases of education is beginning to be recognized by parents—that of hygiene and sanitation—and the women of the institutes of Prince Edward Island have undertaken as their prime work that of bettering these conditions in their schools and surroundings.

"If the promises of the Government of the province are fulfilled and the hearty co-operation of its school inspectors and district representatives maintained, a happier day is dawning for life in Prince Edward Island villages and countrysides through the efforts of its organizations of women's institutes."

The following notes from various institutes indicate the nature of the special work being carried on by practically all the women's institutes of the Island. The majority have also contributed to the Red Cross Society, Belgian Relief and patriotic work.

The East Wiltshire and Warren Grove Institute painted the inside of the East Wiltshire schoolhouse, supplied new shades for the windows, new desk for the teacher and drinking fountain and cups for the children; also papered and cleaned the inside of the Warren Grove schoolhouse and supplied fountain and drinking cups for the pupils of the same.

Meadowbrook.—Have painted the walls and woodwork of the schoolhouse, whitened the ceiling, bought a tank for drinking water, paid for the work of laying a new hardwood floor in the schoolhouse, and will help pay for materials, put up shelves for window plants.

Stirling.—The members of this enterprising institute are fitting up a hall in a vacant house for the use of the institute, after which a programme will be planned for the winter work.

Malpeque.—This institute has, in connection with its regular work as an institute, a sewing circle, which meets independently of the regular institute meetings, but is comprised of members of the institute. These ladies make and sell the garments for the benefit of the treasury of the institute. The funds of this institute have gone toward school improvement, such as the furnishing of new desks in the Malpeque school, as well as improvements in the Hamilton school, janitor services and scrubbing of schools.

York.—To date we have expended the following: For school improvement, $35; for public hall, $34.50; in prizes at Seed Fair and Local Exhibitions, $8; for patriotic work, $119.54.

"The ratepayers in both Lakeville and North Lake district have each agreed to bring a hardwood log to the mill for hardwood floors; the institute is going to pay for sawing, laying, etc."

History of Quebec Homemakers' Clubs.

The history of these organizations as compared with that of the other provinces in the Dominion is unique inasmuch as the women of Quebec, unassisted by the Government, began this work themselves. In all the other provinces of Canada, the Provincial Government has not only assisted in establishing agricultural societies for the benefit of the farmers, but has established separate organizations for the women of the farm homes, and has made special provision for giving them instruction along lines bearing directly upon the duties devolving upon them as homemakers.

The first organization of this kind for women was formed at Dunham, in January, 1911, under the leadership of Mrs. G. M. Beach, who may be justly regarded as the pioneer of this work in Quebec Province. In February, 1914, a convention of representatives from the first formed clubs met at Macdonald College. A constitution was drawn up and the name was changed to Quebec Homemakers' Clubs. The college promised to aid the clubs in every way possible until such a time as the Government should come to their assistance.

The object of Homemakers' Clubs, as set forth in the constitution is as follows: To study the most scientific way of conducting homework in order to economize, strengthen and preserve the health of the family, to discuss the best expenditure of money in order to secure the highest conditions of home life; to provide better financial, social and intellectual advantages for farm boys and girls and yet keep them on the farm; to carry on any line of work which has for its object the welfare of home or community life. All clubs organized shall be strictly non-partizan and non-sectarian in every phase of their work, and no club shall be operated in the interest of any party, sect or society, but for the equal good of all citizens.

The second annual convention of the Quebec Homemakers' Clubs took place at Macdonald College, June 15 and 16, 1915. Forty-one representatives from the various clubs were present. The report of Miss Campbell, demonstrator for the clubs, showed that since the last convention the clubs had increased from eight to thirty-three, and the membership from 252 to 633. The number of lectures and demonstrations given by the demonstrator were 14, and in connection with the January Short Courses, 14, making in all 28. The number of organization meetings held, 31, and the number of clubs organized 25. Lectures and demonstrations by other members of the Household Science Staff, 7. Lectures and demonstrations by members of the staff of the School of Agriculture, 2. Since September last the clubs have been busy with patriotic work, knitting and sewing for the Red Cross, and raising money for the Patriotic and Belgian Relief Funds. Large quantities of supplies have been sent in, as well as considerable sums of money. The clubs already engaged in this good work were urged to continue it until peace comes again, and it was suggested that the clubs lately organized take up the work as soon as possible.

Judging from the enthusiastic discussion following from the various papers read it seems safe to say that the Homemakers' clubs are, and will be to a greater degree every year, a force for the improvement of the home, the school and the community.

APPENDIX E.

MISCELLANEOUS.

THE VETERINARY PROFESSION -ITS IMPORTANCE, INFLUENCE AND PROGRESS.

H. J. P. Good, in the "Farmer's Advocate."

Under the Agricultural Instruction Act, introduced and passed by the present Minister of Agriculture, in the allotment of ten million dollars for the encouragement and development of instruction in agriculture extended over a term of years, it is especially provided that $20,000 shall be set aside for the encouragement and aid of the veterinary colleges. It is not a great sum in proportion to the whole, but it is a good deal, not so much in the amount as in the recognition compared to what has gone before. For more than half a century, yes, for sixty years, veterinary education has progressed in Canada with little more than tacit recognition. Dr. Andrew Smith founded and prosecuted the veterinary college to success, not by official countenance and support, but by shrewd business sense and appreciation of importance. He built a college out of practically nothing and by persistent patience succeeded in gaining what from the first his heart desired—official support and cognizance of a branch of education that is inextricably concerned with the welfare not exclusively of horses, cattle, sheep and swine, but also with that of the nation. The gathering of three students before one master was the beginning of veterinary instruction in Canada.

It is hard to believe but it is the truth that until the advent of Dr. Andrew Smith, then plain Mr. Smith, some fifty or sixty years ago, veterinary knowledge or experience was virtually unknown in this country. If the animal had an ailment that might infect thousands it could go unheeded and few cared. Human beings could have illimitable complaints and the last origin that would be imagined would be the meat they consumed. In recent years the situation has changed. Both the provincial and federal governments have conceded the matter their careful consideration. Municipal health officers have also given the subject attention. They have prescribed all kinds of rules for the inspection of stables between hours, but they have left the other hours to take care of themselves, with the result that slaughterers of animals can in cases wait until the inspector has left and then pursue their own sweet will. At the Toronto city abattoir and at the reputable abattoirs, of course, this is impossible, although it is a question whether every city, town, village and township should not have a law providing that any animal slaughtered without prior, as well as subsequent, official inspection should subject the butcher to a severe penalty.

Important as the subject is there are up to the present but two veterinary colleges or schools in Canada. The time may be near at hand when at least first aid for animals will be taught in rural schools by the side of other agricultural subjects—for veterinary knowledge to a large extent belongs to agriculture—and the elements of the science find a place in the curriculum of every agricultural college. At present, however, education of the kind is confined almost entirely to the Ontario Veterinary College situated to the north of University avenue, Toronto, and the school of Comparative Medicine and Veterinary Science at Montreal.

In other countries as well as in Canada, the veterinary art has an interesting history. Up nearly to the end of the eighteenth century even in Britain, but little

attention had been given to the subject. In 1791 the first veterinary college was established. This was at Camden Town, London, and the institution is still doing good work. Nearly three-quarters of a century later, or to be exact, after 74 years had elapsed, the Albert Veterinary College, named out of regard for the memory of the Prince Consort, Albert of Saxe Cobourg Gotha, who had died four years previously, and who had been the first of royalty to manifest active interest in the profession, was established. Shortly afterwards the Royal College of Veterinary Surgeons received august recognition and by sovereign mandate obtained permission to use the distinguishing prefix to its title. At the same time Fellow of the Royal College of Veterinary Surgeons, or F.R.C.V.S., which the late Dr. Andrew Smith possessed, became an honour much sought after but which comparatively few attained. Thus at least in the old land itself did the veterinary calling receive some part of the dignity and recognition that it richly deserved. Prior, however, to this consummation a college had been established at Edinburgh and it was from there that the founder of the Ontario Veterinary College, and for 46 years its principal, graduated and came to Canada. In 1861, Hon. Adam Ferguson, then president of the Agriculture and Arts Association of Ontario, and George Buckland, professor of Agriculture at Toronto University, went to the Scottish capital and supported by the provincial government of the day made the young graduate an offer which he accepted.

The beginnings of the Ontario Veterinary College were small, as they have been of many things worth while. In 1862 there were but three students. This year—that is 1914-15—there were 232, rather fewer than in some previous years, for the reason that the students of veterinarianism have not been behind their fellows in other educational institutions in offering their services on the field of battle to their country and the empire. Upwards of a hundred have gone, and as a consequence the average of 275 for each of the previous five years dwindled to some extent, but not sufficiently to disprove the statement that, had affairs been normal, the college would not be experiencing the greatest numerical success in students it had ever achieved. In 1908 Dr. Andrew Smith, who died two years later, found his health failing and resigned. The Provincial Department of Agriculture then took immediate control of the college and appointed Dr. E. A. A. Grange, a gentleman of wide experience, to the principalship. Up to this happening only a two-year course was required of students before offering themselves for graduation. With the new order of things a three-year course was decided upon. Not only had the college up to that time attracted an attendance from every part of the Dominion, but also largely from the United States because of the two-year course.

With the addition of another year the attendance from abroad lessened, but the number of Canadians greatly increased, and from being less than half of the total of students became better than three-fourths. Up to the commencement of the 1914-15 term the work of the college had been prosecuted in a building erected on the site on Temperance street, Toronto, where fifty-three years ago its foundation was laid, and from whence had graduated upwards of three thousand students, some of whom gained continental celebrity. In the autumn of 1914 a handsome and commodious new structure, erected by the Ontario Government at a cost of $250,000, on University avenue, in close proximity to Toronto University, with which the veterinary college is affiliated, was occupied. Simultaneously with the taking over of the college by the Department of Agriculture, the two degrees of Bachelor of Veterinary Science and Doctor of Veterinary Science were created. At the same time a stringent act came into force penalizing anybody representing himself as a veterinary surgeon who had not graduated from the college in a fine of not less than $25 and of not more than $100.

In the Province of Quebec, too, veterinary education in recent years has made great advancement. Before 1886 Dr. Charles McEachran conducted a veterinary school in Montreal. In that year and for six years the late Dr. Daubigny delivered lectures

in the French language in the McGill Veterinary School, and for one year at a veterinary school affiliated with Victoria University. In 1893 the legislature of Quebec passed an Act consolidating these two schools and creating The School of Comparative Medicine and Veterinary Science, which became affiliated with Laval University and is still so affiliated. In 1899 it came under the patronage of the Minister of Agriculture, and from that time the trend has been constantly upward and onward. Up to 1913 the lectures were given at Laval University and the clinical demonstrations at the old establishment founded by Dr. Daubigny. In that year a fine new building, especially erected on DeMontigny street, was taken into possession. One of the provisions of the charter is that the Quebec Minister of Agriculture, or the provincial government, shall have the privilege of sending 25 students to the school who shall receive tuition free. Dr. E. P. Lachapelle is president, Dr. F. T. Daubigny, son of the original founder, director, and Dr. A. Dauth, treasurer.

Between the foregoing two institutions the $20,000 grant from the Federal Government previously spoken of is divided annually according to the number of students, and under the terms embodied in The Agricultural Instruction Act of the Dominion.

And now a few words as to the general status of the live-stock interests in connection with the work of the Veterinary Director General. For information on this point we will turn to the report of the Federal Commission of Agriculture on the first year's working of the aforementioned Agricultural Instruction Act. After quoting figures showing that the estimated value of the live stock in Canada in January, 1914, was $659,208,222, embracing 2,947,738 horses, 2,673,286 milch cows, 3,363,531 other cattle, 2,058,045 sheep and 3,434,261 swine, Dr. C. C. James says:—"The Department of Agriculture of Canada is charged with two lines of work known generally as the "Health of Animals" and "Meat Inspection," both of which are under the control of the Veterinary Director General. In the carrying out of this federal work, which is increasing from year to year, men with special training are required. It is desirable that these men be trained in Canada. To meet these demands it is necessary that our Canadian veterinary colleges be well manned and adequately equipped. The work that lies before graduates, apart from private and corporate practice, will be appreciated when it is stated that to the end of 1914, 36 veterinary surgeons had been appointed in connection with the Contagious Diseases Division, and 27 for meat inspection. At the close of 1913 no fewer than 93 veterinary specialists were engaged at abattoirs and canning plants. In addition there is a staff of 25 and more lay inspectors. When it is stated that the total killing in one year amounts to upwards of three million animals and that nearly a million pounds of flesh were condemned besides thousands of hogs and other stock ordered to be slaughtered to check the spread of disease, some idea will be reached of the value and importance of the veterinary profession."

EXTRACTS FROM REPORTS OF DISTRICT REPRESENTATIVES, ONTARIO.

"We held our first school fair at South Mountain on October 1st with an attendance of 800 people. . . . . The school parade proved to be an interesting feature of the fair. We had each school do a march past in front of the judges. They stopped and went through whatever drill had been arranged when directly opposite the judges' platform. After all the schools had gone through their drill, we had them march back and mass in front of the platform and sing 'God save the King' in unison. With something over 300 pupils taking part and most of them waving flags, you can well imagine that it was a very interesting feature."—E. P. Bradt, Dundas County.

"One very noticeable thing in connection with fairs held at places like Stroud for two or three years is the great improvement in the quality of exhibits. Pupils are quick to take notice what kind of exhibits win and they look more to uniformity and quality than to size. Ivy School Fair on the 15th was very much ahead of the one held last year. People in the locality understood the object of the fair better and everyone seemed to be willing to assist it. Last year one calf was shown, while this year we had eleven, and everyone better quality than last year's individual."—J. Langhland, Simcoe County.

"It was a surprise to see the large entry in weed and weed seed collections. Almost every collection was perfectly mounted and named. It was not uncommon to find collections which would compare favourably with those handed in by the second-year students at Guelph. For the weed naming contests we selected 20 specimens at random and there were young boys and girls so well posted as to be able to name the lot without hesitation or mistake. When one gets results like this from a simple weed campaign such as we conducted last summer, it is encouraging. A knowledge of weeds such as was displayed means something too for the clover seed industry of this district. Next year we expect to put on a weed-seed naming contest and increasing the number of prizes for weed classes."—P. Stewart, Kenora District.

"One of the parents told me that he wished to thank the department for the school fair idea. His son, who is about 12 years of age, has taken charge this year of all the calves on his farm. This boy has been experimenting with different feed for calves and has come to the same conclusion at this early age that a number of our most prominent breeders have come to, and that is in regard to the feeding of oil cake to calves. He finds that ground oats with alfalfa hay have given him best results. This was his own report at the school fair."—H. R. Hare, Halton County.

"Good seed distributed to the children has probably done more for us in this county than any other work we have undertaken. To give an instance, practically every farmer is greatly delighted with the O.A.C. No. 72 oats that were distributed this year. Our corn also is giving excellent results, as also are our potatoes, for the simple reason that the seed of these different crops was just as good as could be procured, and we took special pains in selecting it when sending it out. The result is that every one is more than satisfied."—F. C. McRae, B.S.A., Peterborough County.

"Many interesting things develop as the School Fair work becomes established or extended into new territory. We find instances where the chickens hatched from eggs which have been supplied to the pupils are forming the foundation of the home flock, and remunerative results have already been obtained. In one case last year a boy had 11 chickens from his dozen eggs and in the fall disposed of 6 cockerels at not less than $1.50 per bird. There are also several cases where the potatoes have been propagated from year to year and now form the main potato crop on the farm. The same applies to grain, and I have one instance in mind where the father has five acres of O. A. C. 21 barley which originated from the sample given to the son in 1913."—W. D. Jackson, B.S.A., Carleton County.

"I have been shown some excellent fields of grain which have had as a source of seed the small quantities given to the children two or three years ago. The same applies to potatoes. This distribution of the O. A. C. 21 barley throughout this county by means of the School Fair plots has been very striking. Before the seed was distributed through the schools a large majority of the farmers in this district were sowing the two row type of barley. It is now the exception rather than the rule to find this two-rowed barley being grown. There is no question but that the home plots of the Rural School children are an excellent medium for introducing good seed. The value of the School Fairs to the province in this regard alone can hardly be estimated."—E. P. Bradt, B.S.A., Dundas County.

"Never before was I so thoroughly impressed with the need of securing the very best seed for the school fair, and if the school fair is doing nothing else in our county it is laying the foundation for better seed, hence better crops on many of our farms."—A. B. Whale, B.S.A., Middlesex County.

"In response to a call from the trustee board of S. S. No. 3, Rainham, Mr. Archibald and I rendered assistance in laying out a new school ground. Grading stakes were placed at regular intervals over the ground and a system of drains planned as well. Ornamental trees and shrubs will be placed on the ground in due time. These improvements will make the school very attractive, and the spirit is largely due to the work of the rural school fair.

"The trustee board of Hagersville High School has drawn my attention to an expression of appreciation on behalf of the ratepayers in connection with the short course in agriculture held in that school last winter. In order that more of their sons might receive elementary agricultural instruction, they have asked that an agricultural teacher be regularly employed. The board has decided to take steps immediately in securing a competent man and in fitting up a suitable class room."—G. L. Woltz, B.S.A., Haldimand County.

"Reflecting on some of the lines of work which have occupied considerable of our attention, it is gratifying to note that results are becoming more evident daily. About a dozen young men are keeping herd records this year for the first time in the history of the farms they live on. More pure bred sires are heading herds than ever before, and the tendency to go into pure bred stock is evidenced by the large herds of uniform Holsteins and Ayrshires seen on every cross road in agricultural sections. The drainage campaign we have carried on in conjunction with the Physics Department of the O. A. C., has at last brought us a large traction ditcher to help complete the system for which we have made so many surveys. The increased acreage of alfalfa and sainfoin clovers, and the largely increased number of silos and acreage of corn would seem to indicate that our encouragement to the dairy industry at the short courses and special series of meetings is having good results. It is significant too that recently four young men have been into our office to discuss ways and means of taking a course at the agricultural college, and that public school pupils from various sections are beginning a regular correspondence with our office, mostly re school fall fairs."—A. D. McIntosh, B.S.A., Hastings County.

"Throughout the season when we were judging the plots it has been very interesting to note the number of cases where farmers have carefully saved the seed which the pupils had obtained from the seed distributed. I came across one special case at South Bay. John Rose was one of the pupils who in 1914 obtained one pound of O. A. C. No. 72 oats and he won first prize for best kept plot, first prize for sheaf exhibit at the Fair, and first prize for grain exhibit at the Fair, and had a yield of 18 pounds of hand picked seed from the plot. When I visited his place this week his father went with the boy and myself to see his this year's plots which were exceptionally good. He also had a small field which he had seeded with last year's seed. I have another report from the boy's father and he tells me that they have threshed the grain and will have over 10 bushels of excellent seed.

Another case with reference to the chickens was brought to our notice in the township of Hillier. In 1914 Miss Flora Bailey had five pullets and one cockerel, and from these alone she and her parents have raised over 150 chickens this season. These are merely two examples from different parts of the county and represent possibly better than the average."—A. P. MacVannel, B.S.A., Prince Edward County.

"One of the boys who had secured two pullets and a cockerel from the eggs supplied last year has already hatched 75 chickens from these and has another setting

coming on. The introduction of so many chickens from the bred-to-lay strain cannot help but have a beneficial effect on the poultry farms in the district.

On the whole the children have evinced more interest this year than last, more care being taken to follow the directions which were given them with the materials, and it is pleasing to note that the parents are also becoming interested, as was evinced by one statement made at one place where they had never had a garden before, but in connection with the School Fair work the material was distributed and the interest manifested by the children led them to put in a garden for their own use as well."—R. S. Beckett, B.S.A., Northumberland County.

"Kindly send me a supply of leg bands, as my chickens have outgrown the others. The chickens are very large and healthy and are much different from ones my mother raises. I am very much interested in the chickens and would be glad to have any news concerning them. Your interested pupil."—J. T. Johnston, Kent County.

"In visiting one little girl's plot I was surprised to learn of her success with the bred-to-lay chickens which she raised last year. She sold four cockerels last fall at two dollars each and made nearly as much more by selling eggs, along with her prize money at the fair."—I. C. Steckley, B.S.A., York County.

"Yours to hand *re* cheque for $5, Clarke Rural School Fair Association. Might say that I was more than pleased to make out same for such valuable work. I am sure that if anything needs encouragement it is the agricultural system to keep our boys on the farm and give them a start that they perhaps may follow to success. So many have failed and have gone to the town and city only to make things worse. However, the time is near at hand when nearly all classes and creeds will come back to the land. I wish the officers and directors a huge success in their new undertaking, and that it may grow with the boys and girls so that they can in after years look back with pride to their early start in life. Yours very truly."—To R. S. Duncan, B.S.A., Durham County.

"It is quite gratifying to listen to the expressions of opinion by the parents. One farmer said that he thought that the strain from which eggs were distributed last year was the best that he had come across, as the pullets raised in competition had laid well all winter, and right on through the spring and summer, two-thirds of them not offering to cluck at all. Another woman said, "I think this work is just splendid, Mr. Carroll. When my boy moved out here from the city two years ago he didn't know corn from potatoes, now he not only knows the sorts of farm crops, but also the difference in varieties, as well as weeds that are troublesome. Last year he received eggs, and had splendid success with them, so much so that he won first prize for the best flock at the school fair. That settled it—he wanted full charge of the poultry right away, and since last fall no one else has had anything to do with the chickens. He has been getting the eggs, too."

"Still another farmer when looking at his son's grain mixture plot said, "There is a fine object lesson now—look at the way that oats and barley have ripened uniformly. I did not know that there was a variety of oats that ripened as early. It looks as though there would be a good yield, too. I think that mixture should be used on our farms."

"The home grown root seed which quite a number of pupils are growing is attracting a good deal of attention."—J. A. Carrol, B.S.A., Peel County.

"In nearly every case the O. A. C. No. 72 oat has been superior to the varieties grown by the parents. As a result of this distribution quite a number of farmers have considerable areas sown from the product of the seed distributed last year. The distribution of Barred Plymouth Rock eggs is also working out in the same way, and

this will mean the elimination of a great many mongrel flocks of chickens. Besides this, most of the boys and girls who received eggs are selling their cockerels to their neighbours as breeding stock."—A. A. Knight, B.S.A., Victoria County.

"I received a great deal of encouragement from the visit, as one of the councillors talked very highly of the school fair proposition, stating that the benefits that will be derived are not as apparent at the present time as they will be a few years hence. He gave as an instance that his own children had never handled a hoe or pulled a weed before the school fairs were held, but since taking hold of school fair work he finds it hard to keep them away from their plots."—P. S. D. Harding, B.S.A., Lanark County.

"We visited an alfalfa experiment on the farm of Mr. John Thom, of Walter's Falls. It was a three plot experiment, each plot containing ⅛₀ of an acre and the varieties tested on two of the plots were Grimm and Ontario variegated. The seed for the other plot was purchased from the local store. The first cut had just been cut and weighed and the yields from Ontario Variegated and Grimm's were the same, being 190 pounds from the plot, and from the other plot it was only 120 pounds. This certainly gives convincing evidence of the value of sowing the best varieties of alfalfa seed."—F. S. Reeker, Assistant, Grey County.

"Our work in assisting farmers to combat the grasshopper outbreak was extended considerably west of the district in which we had been giving assistance during the previous week. We held one meeting at Berkeley and then made arrangements with a committee to visit the farmers not represented at the meeting. No difficulties were experienced in persuading the farmers to treat their fields. We should like to be able to give an estimate of the number of acres treated, but such is impossible. All the stores in Markdale have sold every pound of bran, Paris Green and black strap that they had on hand. What is being used now is coming from Berkeley, Holland Centre and Chatsworth."—H. C. Duff, B.S.A. Grey County.

"I inspected two of the oat plots in the acre profit competition. One interesting feature of this work is the fact that the oats for one of the competitor's plots were treated with formalin for the prevention of smut, while the main corp of oats grown by the competitor's father was sown untreated. The result is that you can scarcely find one head of smut in the plot grown by the son in the competition, while the main crop grown by the father is about one-quarter smut."—C. Main, B.S.A. Frontenac County.

"On July 7th we held a milk testing demonstration at Hymers. We took our Babcock tester and necessary equipment up there for this work and it proved very interesting and successful. Following the demonstration in testing, which was given in the evening short course, lectures were given on the care and handling of milk on the farm. Previous to this demonstration we sent out instructions regarding the sampling of the milk for testing purposes, and many farmers were there with samples, anxious to find out which cow gave the purest milk. Some of the farmers were disappointed in that their samples tested lower than they expected, while others were pleased to learn that their samples were rich in butter fat. 25 samples were tested, 50 people were present."—G. W. Collins, B.S.A., Thunder Bay.

"The milk testing has awakened an interest in this section and shown the people the folly of keeping poor milkers and poor testing cows. Several of the farmers had already decided to fatten a number of their cows as they were boarders."—I. B. Whale, B.S.A., Middlesex County.

"I have been looking over the corn variety test plots this week, and am much pleased with the showing that these plots are making. Gage Brothers, in Glanford, told me that they were very much disappointed in the appearance of the seed; it was not nearly as good in appearance as some which they obtained from an Essex County

grower; but the corn which came up in our plot gave a 100 per cent stand while they found it necessary to go over the rest of the field and replant it. They agree that $1.50 a bushel extra for guaranteed corn would be a pretty good investment."—R. L. Vining, B.S.A., Wentworth County.

"Hogs entered in the feeding hogs for profit competition were also examined and details concerning the contest discussed with the boys. Most of the boys are weighing the hogs frequently and noting gains from different feeds. It was gratifying to know that the boys who had been supplied with milk testers were keeping accurate record of their cows. One young man, Clayton Mansfield, was found to be keeping accurate accounts of his poultry, the accounts comprising amount and kinds of food fed, number of eggs sold locally, those used in the house and those used for setting, the net receipts were estimated monthly and showed a nice profit.

"I attended the meeting of the Middleton township council to ask for a grant of $15 to the Rural School Fall Fair."—Geo. Wilson, B.S.A., Norfolk County.

AGRICULTURAL TEACHING AT PRINCE OF WALES COLLEGE, PRINCE EDWARD ISLAND.

Mr. Wilfrid Davison, the professor in charge of the Agricultural Instruction work at Prince of Wales College, gave up his work to serve the Empire, and in the summer of 1915, Professor S. B. McCready, formerly director of agricultural instruction in Ontario, was appointed to fill the vacancy.

The following papers, set for the Christmas examination, will indicate the character of the agricultural instruction being given at the College.

Fall Term Examinations, 1915.

3rd Year Rural Science.

1. Discuss briefly the changes in rural and urban population in P. E. Island as shown by the 1901 and 1911 Censuses. Explain the causes of the changes and the probable population returns of future censuses.

2. By reference to the studies and lessons that might be made on a sunflower plant, compare the (*a*) method and (*b*) purpose of (1) Nature study (2) Elementary Science (botany) and (3) Elementary Agriculture.

3. Write brief descriptive and explanatory notes on (*a*) The Agricultural Gazette of Canada, (*b*) The Audubon Bird Charts, (*c*) A Weather Map, (*d*) The P. E. I. Egg and Poultry Co-operative Association, (*e*) A School Progress Club.

4. Explain the origin, terms, purposes and practical working in P. E. I. of the Agricultural Instruction Act passed by the Dominion Parliament in 1913.

5. Describe an ideal rural school and ideal scheme of education for rural communities in P. E. Island.

1. Rural Science.

1. Term Work, based on class work, records, home projects, etc.

Nature Study.

2. On a full page of the examination paper make a diagram of the block of land on which the Prince of Wales College is located, marking on it (*a*) the names of the streets bounding the property, (*b*) the site of the college building, (*c*) the proposed school gardens for 1915, (*d*) the 1914 school garden, (*e*) the walks and driveways, (*f*) the points of the compass.

3. Write brief descriptive notes of any three of the following:—(*a*) daily weather map, (*b*) a monthly weather map, (*c*) a red-eyed vireo's nest, (*d*) the trees on the grounds of Prince of Wales College, (*e*) the Audubon Bird Charts, (*f*) how a pigeon flies. *Or*

Give an account of three independent "nature studies" you have made this fall, stating clearly what you saw and learned.

Elementary Agriculture and Horticulture.

4. Write a brief account of the wealth represented in the agricultural industry of Prince Edward Island. Compare and give the returns from the common crops.

5. Explain how to grow tulips for indoor winter blooming.

6. Show by diagrams the construction of (*a*) an extractor (*b*) a feeder used in bee-keeping, and explain why, how and when they are used.

7. Briefly outline the work carried on at (*a*) The Egg Candling Station, (*b*) The Prince Edward Island Experimental Farm. Explain how these may be made to serve the agricultural interests of the Province in the largest measure.

8. In 1914, according to the Experimental Farm report, it required 1,858 lbs. of hay, 1,871 lbs. of oats, 2,717 lbs. of bran, 10,315 lbs. of roots, and 5½ months of pasturing to feed the Farm dairy cow. Calculate the cost, allowing $7 a ton for hay, $25 a ton for oats and bran, $2 a ton for roots, and $1 a month for pasturage. She gave 7,881 lbs. of milk. At 5 cents a quart, what was the gain or loss, allowing a gallon of milk to weigh 10 lbs.

Pedagogy.

9. Explain this statement. "Nature study is a method of teaching and learning, as much as it is a subject." What is meant by so-called "Nature Study" History and explain how it might be taught. *Or,*

Distinguish between Nature Study and Elementary Agriculture. What educational purposes are served in teaching these two subjects?

10. Write explanatory notes on (*a*) "The Brown Mouse," (*b*) the work done up to the present on the proposed garden for rural schools at the south side of the Prince of Wales College (*c*) the method and advantages (or disadvantages) of using agricultural papers in rural schools. *Or,*

Does a farmer need a good education? Why? By reference to his work show what kind of education he should have; how will he get this?

NUMBER OF REGULAR STUDENTS ENROLLED FOR 1915-16 AT AGRICULTURAL COLLEGES AND SCHOOLS AND AT VETERINARY COLLEGES IN CANADA.

Ontario.

ONTARIO AGRICULTURAL COLLEGE, GUELPH.

Course for the Associate Diploma—	
First year	120
Second year	95
Course for the Degree of B.S.A.—	
Third year	76
Fourth year	48
Course of the Degree of B.Sc. (Agr.)	
Third year	1
Fourth year	1
Total	341

MACDONALD INSTITUTE.

Domestic science courses	[illegible]

QUEBEC.

MACDONALD COLLEGE, STE. ANNE DE BELLEVUE.

School of Agriculture—	
Regular course in Agriculture leading to Associate Diploma—	
First year	36
Second year	27
Leading to Degree of B.S.A.—	
Third year	23
Fourth year	18
Total	104

SCHOOL OF HOUSEHOLD SCIENCE.

Institution administration, senior	—
Institution administration, junior	11
Homemakers	35
Total	46

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIÈRE.

First year	21
Second year	10
Third year	17
Total	48

OKA AGRICULTURAL INSTITUTE, LA TRAPPE.

Practical or two-year course	37
Scientific or Four-year Course—	
First year	29
Second year	26
Third year	20
Fourth year	7
Total	119

MANITOBA.

MANITOBA AGRICULTURAL COLLEGE.

Agriculture—	
First year	97
Second year	63
Third year diploma	14
Third year degree	27
Fourth year	16
Fifth year	13
Total	[illegible]
Home Economics—	
First year	70
Second year	25
Third year	9
Total	104

Saskatchewan.

COLLEGE OF AGRICULTURE, UNIVERSITY OF SASKATCHEWAN.

	Associate Course.	Degree Course.	Total.
First year	75	7	82
Second year	26	3	29
Third year	10	7	17
Fourth year	2	3	5
Affiliated colleges	....	....	10
Total	107	20	137

Alberta.

AGRICULTURAL SCHOOL, OLDS.

First year, boys, 60; girls, 38	98
Second year, boys, 23; girls, 7	30
Total	128

AGRICULTURAL SCHOOL, CLARESHOLM.

First year, boys, 45; girls, 28	73
Second year, boys, 21; girls, 9	30
Total	103

AGRICULTURAL SCHOOL, VERMILION.

First year, boys, 18; girls, 11	29
Second year, boys, 14; girls, 3	17
Total	46

UNIVERSITY OF ALBERTA, EDMONTON.

Faculty of agriculture	13

Nova Scotia.

AGRICULTURAL COLLEGE, TRURO.

First and second years	77

Veterinary Colleges.

ONTARIO VETERINARY COLLEGE, TORONTO.

First year	58
Second year	50
Third year	81
Total	189

LAVAL VETERINARY SCHOOL, MONTREAL.

First year	19
Second year	19
Third year	20
Total	58

Summary.

Ontario.

Agriculture	315
Domestic science	125
Quebec—	
Agriculture	271
Household science	46
Manitoba—	
Agriculture	228
Home economics	104
Saskatchewan—	
Agriculture	137
Alberta—	
University Faculty of Agriculture	13
Agricultural Schools—	
Students in agriculture	181
Students in household science	96
Veterinary colleges	247
Total	1,750

In addition to the number of regular students in agriculture and veterinary science, there are 27 Arts students taking an elective course in agriculture at the University of British Columbia, and 6 students are registered at Queen's University in the course of B. Sc. (Agr.).

APPOINTMENTS BY PROVINCES AGRICULTURAL INSTRUCTION ACT.

ONTARIO.

Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant.

Ontario Agricultural College, Guelph.

Lecturer in Poultry, F. N. Marcellus, B.S.A.
Lecturer in Farm Management, A. Leitch, B. S. A.
Demonstrator in Horticulture, H. S. Fry, B.S.A.
Demonstrator in Chemistry, W. L. Iveson, M.A.
Lecturer in Animal Husbandry, J. P. Sackville, B.S.A.
Poultry Specialist, J. P. Hales, B.S.A.
Horticulturist, G. J. Culham, B.S.A.
Assistant in Soil Work, F. Bryant.
Assistant in Drainage Work, A. E. McLaurin.
Assistant in Drainage Work, C. M. Laidlaw.
Assistant Apiarist, Geo. F. Kingsmill.

Department of Agriculture, Toronto.

Vegetable Specialist, S. C. Johnston, B.S.A.
Director, Corporation and Markets Branch, F. C. Hart, B.S.A.
Stenographer, Markets Branch, Miss Reid.
NOTE.—*District representatives, their assistants and office help are not included.*

Department of Education, Toronto.

Director of Elementary Agricultural Education, Dr. J. B. Dandeno.
NOTE.—*Field agents and others employed during the summer season are not included.*

Ontario Veterinary College, Toronto.

(*Part-time lecturers.*)

Instructor in Clinics and Restraint of Animals, J. N. Pringle, M.R.C.V.S.
Demonstrator in Histology and Bacteriology, M. D. McKichan, B.A., M.D.
Demonstrator in Histology, H. G. Wilson, B.A., M.B.
Examiner, S. A. Cudmore, B. A. (Oxon.)

QUEBEC.

(A.)—List of persons, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Instructor, Rev. J. B. A. Allaire, St-Thomas-d'Aquin, St. Hyacinthe Co.
" L. P. Belzile, Dept. of Agriculture, Quebec.
" Raoul Dumaine, St. Guillaume d'Upton, Yamaska Co.
" J. C. Morgan, Dept. of Agriculture, Quebec.
" Bacon Industry, A. C. St. Pierre, St. Vallier, Bellechasse Co.
" J. M. Talbot, Dept. of Agriculture, Quebec.

Expert, Bacon Industry, A. Hansen, Dept. of Agriculture, Quebec.
Seed Expert, Louis Lavallée, St. Guillaume, Yamaska Co.
Entomologist, Rev. V. A. Huard, Quebec Seminary, Quebec.
Horticulturist, J. H. Lavoie, Dept. of Agriculture, Quebec.
Poultry Superintendent, Rév. Frère Liguori, Dept. of Agriculture, Quebec.
Poultry Superintendent, Léon Picard, Dept. of Agriculture, Quebec.
District Agronomist, H. Cloutier, Rougemont, Rouville.
" J. M. Leclair, Dept. of Agriculture, Quebec.
" R. A. Rosseau, Acton-Vale, Bagot Co.
" Alp. Désilets, L'Ange Gardien, Montmorency Co.
" J. C. Magnan, St. Casimir, Portneuf Co.
" Abel Raymond, St. Vallier, Bellechasse Co.
Asst. District Agronomist, J. A. Fortin, St. Casimir, Portneuf Co.
" Alph. Paquet, L'Ange Gardien, Montmorency Co.
Lecturer, Rév. Ol. Martin, St. Dènis, Kamouraska, Co.
" Rév. A. Michaud, St. Philippe de Néri.
Clerk, J. D. Barbeau, 142 rue Sauvageau, Quebec.
" L. E. Kronstrom, Rue Wolfe, Lévis.
" O. Roberge, Ste. Rosalie, Bagot.

(B.)—List of persons, regularly employed, whose salaries are paid in part from the Agricultural Instruction grant:—

Comptable, J. Arthur Paquet, Department of Agriculture.

College of Agriculture.

Ste. Anne de la Pocatière, Kamouraska.

The salaries of the following are paid wholly from the Federal Subsidy:—
Professor of Arboriculture, R.R. P. Levasseur.
" Horticulture, A. Létourneau.
" Mathematics, E. Bernier.
" Agronomy, M.M. F. N. Savoie.
Professor, M. Robert Leboue.
Professor, Aimé Boutet.
Director and Professor, R.R. Noel Pelletier.
Assistant Director and Professor, H. Bois.
Entomologist, A. Beaudoin.
Assistant chef de pratique générale, M.M. Philéas Boulet.
Arboriculturist, Albert Jalbert.
Instructor in Dairying, Ernest Lizotte.
Instructor in Horticulture, J. A. Gosselin.
Instructor, Francois Dionne.
" Alfred Robichaud.
Serviteur, M. Stanislas LeBel.
The salaries of the following are paid in part from the Federal Subsidy:—
Professor of Chemistry, M.M. Georges Bouchard.
Instructor in Poultry work, Alfred Grégoire.
Instructor, Alfred Robichaud.
" Nap. Arton.

The Oka Agricultural Institute.

La Trappe, P.Q.

The salaries of the following are paid wholly from the Federal Subsidy:—
Director, R.R. Père Jean de la Croix.

Chef Générale de Pratique, Fr. Sébastien.
" " Fr. Gérard.
Préfet de Discipline, Fr. Roch.
Anmonier, P.P. Hubert.
" Yves.
Institute Secretary, D. Fortin.
Professor of Physics, J. W. Ponton.
" Génie Rural, P. Maur.
" Agriculture, Phillipe Roy.
" Entomology, Firmin Létournean.
" Veterinary Medicine, Dr. A. Dauth, Montreal.
Professor of Apiculture, R.R. Père Maur.
" Horticulture, R.R. Père Athanese.
" Poultry Husbandry, Frère Wilfrid.
Instructor, Agricultural Engineering, H. Nagant.
" Horticulture, L. Arscott.
Vergers et Pépinière, P. Honoré.
The salaries of the following are paid in part from the Federal Subsidy:—
Professor of English, R.R. Frère Benjamin.
" Arboriculture, Père Léopold
" Frère Isidore.

QUEBEC.

Macdonald College.

Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Crop Investigator, P. A. Boving, Cand. Phil., Cand. Agr.
Veterinarian, N. E. McEwan, V.S., D.V.M.
Sheep Husbandry, A. A. McMillan, B.S.A.
Asst. in Biology, E. M. Duporte, B.S.A., M.Sc.
" Physics, R. Dougall, B.S.A.
" Animal Husbandry, A. E. MacLaurin, B.S.A.
" Chemistry, J. G. Van Zoeren.
Demonstrator Homemakers' Clubs, Miss F. Campbell.
Rural School Demonstrator, J. E. McOuat, B.S.A.

MANITOBA.

(A.)—Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:—

Instructor Chemistry, A. J. Galbraith, Manitoba Agricultural College.
Instructress Household Art, Mrs. C. L. Groff, Manitoba Agricultural College.
Commissioner, Dairy, W. J. Crowe, Dept. of Agriculture, Winnipeg.
Inspector, Demonstration Farms, G. H. Jones, Dept. of Agriculture, Winnipeg.
Inspector, Dairy Products, L. A. Gibson Dept. of Agriculture, Winnipeg.
District Representative, L. V. Lohr, Neepawa.
" " W. T. G. Wiener, Morris.
" " H. F. Danielson, Arborg.
" " N. S. Smith, Killarney.
Bee Representative, R. M. Muckle, Dept. of Agriculture, Winnipeg.
Instructress Home Economics, Miss Gowsell, Manitoba Agricultural College.
" " Miss Crawford, Manitoba Agricultural College.
Clerk, Wm. Johnstone, Manitoba Agricultural College.

Stenographer, Miss Hay, Manitoba Agricultural College.

(B.)—Officers, regularly employed, whose salaries are paid in part from the Agricultural Instruction grant:

Horticulture, J. A. Neilson, Manitoba Agricultural College.
Accountant, J. P. Grant, Dept. of Agriculture, Winnipeg.
Representative and Lecturer, J. E. Sirette, Roblin, Man.

SASKATCHEWAN.

(A.)—Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Field Representative, *A. J. McPhail, Dept. of Agriculture, Regina.
" " *E. H. Hawthorne, Dept, of Agriculture, Regina.
" " J. W. Hunter, Dept. of Agriculture, Regina.
Dairy Inspector, J. A. McDonald, Dept. of Agriculture, Regina.
Director. Co-operative Work, W. W. Thomson, Dept. of Agriculture, Regina.
Professor Cereal Husbandry, G. H. Cutler, College of Agriculture, Saskatoon.
Professor Animal Husbandry, A. M. Shaw, College of Agriculture, Saskatoon.
Asst. Professor Animal Husbandry, H. J. Tisdale, Col. of Agriculture, Saskatoon.
" Agricultural Engineering, J. McGregor Smith, College of Agriculture, Saskatoon.
" Poultry Husbandry, R. K. Baker, College of Agriculture, Saskatoon.
" Dairying, K. G. McKay, College of Agriculture, Saskatoon.
" Physics, A. E. Hemmings, College of Agriculture, Saskatoon.
" Chemistry, I. Thorvaldson, College of Agriculture, Saskatoon.
Instructor in Chemistry, S. L. Basterfield, College of Agriculture, Saskatoon.
Asst. in Soil Analysis, J. G. Lewis, College of Agriculture, Saskatoon.
" " C. Bridgeman, College of Agriculture, Saskatoon.
" " F. J. Freer, College of Agriculture, Saskatoon.
" Animal Husbandry, John Strain, College of Agriculture, Saskatoon.
" Field Husbandry, H. Saville, College of Agriculture, Saskatoon.
" " H. Henne, College of Agriculture, Saskatoon.
" " S. Wright, College of Agriculture, Saskatoon.
" " G. Fountain, College of Agriculture, Saskatoon.
Director of Women's Work, Miss A. DeLury, College of Agriculture, Saskatoon.
Lecturer for Homemakers' Clubs, Miss Daisy Harrison, College of Agriculture, Saskatoon.
Director, School of Agriculture, F. W. Bates, Dept. of Education, Saskatoon.
" " A. W. Cocks, Dept. of Education, Regina.
" " Miss F. A. Twiss, Dept. of Education, Regina.

(B.)—Officers, regularly employed, whose salaries are paid in part from the Agricultural Instruction grant:

Asst. Cooperative Work, Q. G. Mawhinney, Dept. of Agriculture, Regina.
District Representative, J. G. Rayner, North Battleford.
District Representative, T. L. Guild, Shaunavon.
" " *Wm. Betts, Rosetown.
" " *J. L. Brown, Swift Current.
Field Representative, Live Stock, F. H. C. Green, Dept. of Agriculture, Regina.

(C.)—Officers employed a part of each year whose salaries are paid from the Agricultural Instruction grant:

Field Representative, E. W. Brett, Live Stock Branch, Dept. of Agriculture, Regina.
" " J. S. Fulton, Live Stock Branch, Dept. of Agriculture, Regina.

*Enlisted.

Field Representative, W. A. McCorkell, Dairy Branch, Dept. of Agriculture, Moosomin.
" Jas. Graham, Dairy Branch, Dept. of Agriculture, Oxbow.
" L. C. Wirtz, Dairy Branch, Dept. of Agriculture, Wadena.
" L. E. Kirk, Weeds Branch, Dept. of Agriculture, Saskatoon.

*Enlisted.

ALBERTA.

(A.)—Officials of Schools of Agriculture, whose salaries are paid wholly from the Agricultural Instruction Grant:

Instructor in Dairying and Dairy Farming, S. G. Carlyle, Dept. of Agriculture, Edmonton.

(B.)—Officials of Schools of Agriculture whose salaries are paid in part from the Agricultural Instruction grant:

Principal, F. S. Grisdale, Vermilion.
Instructor in Science, E. S. Hopkins, Vermilion.
Instructor in Farm Mechanics, L. Shanks, Vermilion.
Instructor in Animal Husbandry, H. H. McIntyre, Vermilion.
Plotman, Alex. Carlyle, Vermilion.
Instructor in Domestic Science, Fern Hotton, Vermilion.
Asst. Instructor in Domestic Science, A. M. Lavalee, Vermilion.
Stenographer, Dorothy Thompson, Vermilion.
Instructor in Home Nursing, Laurie Coates, Vermilion.
Principal, W. J. Elliott, Olds.
Agricultural Mechanics, G. R. Holeton, Olds.
Instructor in Science, Jas. G. Taggart, Olds.
Agronomist, O. S. Longman, Olds.
Instructor in English, J. H. McNally, Olds.
Instructor, Household Science, Marjorie M. Goldie, Olds.
Asst. Instructor, Household Science, Ada M. Davis, Olds.
Stenographer, Edith J. Murray, Olds.
Labourer, Geo. Moffat, Olds.
Dairy Tester, Alex. Lamont, Olds.
Principal, W. J. Stephen, Claresholm.
Instructor in English and Elementary Science, J. C. Hooper, Claresholm.
Instructor, Animal Husbandry, H. W. Scott, Claresholm.
Instructor in Agricultural Mechanics, A. E. Qually, Claresholm.
Instructor in Domestic Science, Myrtle A. Hayward, Claresholm.
Asst. Instructor, Domestic Science, Grace Robertson, Claresholm.
Stenographer, Mabel Moir, Claresholm.
Labourer on Plots, Chas. G. Price, Claresholm.

(C.)—Officials of Women's Institutes, whose salaries are paid wholly from the Agricultural Instruction grant:

Superintendent, Miss Mary McIsaacs, Dept. of Agriculture, Edmonton.
Assistant, Miss A. T. Carlyle, Dept. of Agriculture, Edmonton.

BRITISH COLUMBIA.

(A.)—Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Director, Elementary Agricultural Education, J. W. Gibson, Victoria.
District Supervisor, Elementary Agricultural Education, J. C. Readey, Chilliwack.
Markets Commissioner, R. C. Abbott, Vancouver.

Asst. Veterinary Inspector, D. M. Sparrow, Vancouver.
" " D. H. McKay, Chilliwack.
" " W. T. Brookes, Ladysmith.
Asst. Plant Pathologist, M. H. Ruhmann, Vernon.
Asst. Agriculturist, S. F. Dunlop, Telkwa.
Silo Operator, J. Ferris, Victoria.
Asst. Horticulturist, M. H. Howitt, Prince Rupert.
" E. C. Hunt, Grand Forks.
Instructor, Soil and Crops, W. Newton, Victoria.
Caretaker, egg-laying contest, W. H. Stroyan, Victoria.

(B.)—Officers, regularly employed, whose salaries are paid partly from the Agricultural Instruction grant:

Cow-tester, L. H. Thornbery.
" A. White, Courtenay.
" E. Rive, Ladner.

The above list does not include seasonal appointments.

Nova Scotia.

(A.)—List of persons, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

County Representative, H. McPherson, Antigonish County.
" " H. S. Cunningham, Cape Breton County.
" " H. B. Langille, Cape Breton County.
" " J. M. McKenzie, Cape Breton County.
" " C. M. Dickie (part time), Lunenburg County.
Asst. Provincial Dairy Supt., W. J. Baird, Dept. of Agriculture, Turo.
Asst. Provincial Entomologist, C. A. Good, Dept. of Agriculture, Truro.
Entomological Field Work Supt., H. G. Payne, Dept. of Agriculture, Truro.
Drainage Surveys, A. E. Humphrey, Dept. of Agriculutre, Truro.
Soil Analyst, V. B. Robinson, Dept. of Agriculture, Truro.
Women's Institute, Supt., Miss Jennie A. Fraser, New Glasgow.
Director Rural Science, L. A. DeWolfe, Truro.
Dean Rural Science Schools, C. L. Moore, Halifax.

(B.)—List of persons, regularly employed, whose salaries are paid in part from the Agricultural Instruction grant:

Dairy Supt., W. A. McKay, Truro.
Accountant, C. R. B. Bryan, Truro.
Prof. of Agriculture, J. M. Trueman, Agricultural College, Truro.
Prof. of Horticulture, P. J. Shaw, Agricultural College, Truro.
Prof. of Zoology, W. H. Brittain, Agricultural College, Truro.
Prof. of Botany, H. W. Smith, Agricultural College, Truro.
Prof. of Chemistry, J. M. Scott, Normal College, Truro.
Prof. of Physics, J. A. Benoit, Normal College, Truro.
Prof. of Normal Training, F. G. Mathews, Normal College, Truro.
Agricultural Instructor, E. C. Allen, Yarmouth Academy.
Drainage and Field Experiments, *B. H. Landels, Agricultural College, Truro.
Entomological Inspector, J. P. Spittall, Agricultural College, Truro.
" " W. W. Whitehead, Agricultural College, Truro.
" " L. G. Saunders, Agricultural College, Truro.
" " F. C. Gillatt, Agricultural College, Truro.
" " L. M. Howe, Agricultural College, Truro.
" " C. F. W. Whitman, Agricultural College, Truro.

*Enlisted.

NEW BRUNSWICK.

Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Provincial Horticulturist, A. G. Turney, B.S.A., Fredericton.
1st Asst. Horticulturist, R. P. Gorham, B.S.A., Fredericton.
Dairy Superintendent, L. C. D'Aigle, Moncton.
" " C. W. McDougall, Sussex.
Asst. Dairy Superintendent, N. W. Eveleigh, Sussex.
Poultry Superintendent and Bee-keeping, Seth Jones, Sussex.
Instructor in Fertilizers, H. B. Durost, Woodstock.
Entomologist, William McIntosh, St. John.
Supt. Agricultural Societies, J. E. DeGrace, Petit Roches.
Director Elem. Agricultural Education, R. P. Steeves, Sussex.
Asst. Field Husbandman, B. T. Reed, Woodstock.
Supervisor, Women's Institutes, Hazel E. Winter, Fredericton.

The following, having enlisted for overseas service, are not now under pay, but their positions are being held open for them for one year:

R. Newton, Director Agricultural Schools and Field Husbandman.
W. D. Ford, Animal Husbandman.
D. B. Flewelling, 2nd Asst. Horticulturist.

PRINCE EDWARD ISLAND.

(A.)—Officers, regularly employed, whose salaries are paid wholly from the Agricultural Instruction grant:

Director Agricultural Instruction, W. R. Reek, B.S.A., Dept. of Agriculture, Charlottetown.
Head of Rural Science Dept., Prince of Wales College, S. B. McCready, Dept. of Agriculture, Charlottetown.
Asst. Secy. of Agriculture, Norman McLeod, Dept. of Agriculture, Charlottetown.
Director, Agricultural Instruction in Public Schools, *Charles Buxton, Alma.
" " " " D. S. Fraser, Tyne Valley.
" " " " Walter Curtis, M.A., Milton.
" " " " William Cain, New Perth.
" " " " Gerald McCarthy, Tignish.
" " " " L. A. Adams, Montague.
District Representative, W. J. Reid, B.S.A., Summerside.
" " Leslie Tennant, B.S.A., Charlottetown.
Instructor in Field Husbandry, *Wilfrid Davison, B.S.A., Charlottetown.
Asst. Supervisor of Women's Institutes, Miss Hazel Sterns, Charlottetown.
Asst. Supervisor of Women's Institutes, Miss Alberta Macfarlane, Charlottetown.
Accountant, Miss A. W. Newbery, Charlottetown.
Stenographer, Miss Bessie Alward, Summerside.

(B.)—Officers, regularly employed, whose salaries are paid partly from the Agricultural Instruction grant:

Secy. of Agriculture, Theodore Ross, B.A., Dept. of Agriculture, Charlottetown.

*Enlisted.